

AMERICAN GAS ASSOCIATION MONTHLY



Vol. V

No. 12

DECEMBER, 1923

**“New gas storage
tanks are the great
landmarks of a city’s
increasing pros-
perity.”**

*—From address of Dwight N. Lewis
before the Fifth Annual Convention*

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FOR STATEMENTS AND OPINIONS CONTAINED IN PAPERS AND DISCUSSIONS
APPEARING HEREIN, THE ASSOCIATION DOES NOT HOLD ITSELF RESPONSIBLE

AMERICAN GAS ASSOCIATION MONTHLY
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Live and Learn

It surely is a wise man who not only believes in the adage "Live and learn," but who also has the happy faculty of making a direct application of this new learning.

For, while much personal gain may follow the actual absorption of the knowledge, the larger benefits that lie hidden within the newly acquired learning will be lost if this direct application is not made.

Let us take as an example the procedure of one of our sister utilities as exemplified in the following letter received at these headquarters:

THE WESTERN UNION TELEGRAPH COMPANY Incorporated

Manager's Office, November 7, 1923.
Room 1215, Canadian Pacific Bldg., N. Y.

Mr. Oscar Fogg,
c/o American Gas Assn.,
342 Madison Ave., N. Y.
Dear Sir:

Senders ordinarily have no means of learning just how prompt the service is on their messages and I am, therefore, glad to be in a position to advise you that your message of October 30th to R. B. Brown, Milwaukee, Wis., filed with us at 11:28 a. m., reached its destination at 11:37 a. m., or only 9 minutes later.

We take pride in our excellent service and I am sure you will be interested in this example.

Yours truly,

(Signed) A. HEITNER, Manager.

And right here we might add in passing that this is a most worthy example full of fruitful benefit.

Now, if we would really "Live and learn" from this in its fullest sense, that is, *apply* this knowledge, might it not be of great benefit to our industry?

We know that the service that our companies give is universally good. We are proud of that service—just as proud as the telegraph company is of its service.

But do our customers and the public in general know about it?

Can we not only learn something from that letter, but can we not also make a direct application of this knowledge for our own good?

If we make an installation in record time—if we quickly and completely satisfy a customer's request over considerable difficulties—if we clear up and remedy a complaint in short order, in other words, if we run across any item of our service which is exceptionally good, why keep it to ourselves? Why not apply this new learning and tell that particular customer what we have done for him just as the telegraph company has done?

And why not go a little further and see that *all* the customers know what we did? Won't they be interested and won't it go a long ways toward improving our relations with those same customers—the public?

Think it over.

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Public Ownership*

F. G. R. GORDON

A GREAT MANY millions of American people are running loose up and down the highways and byways and the broad walks of this country, who earnestly and honestly believe that the City, the State or the Nation can operate industry better than such men as you, and the reason for that is that there is a calamity-howler born every minute, and he lives for fifty years, and along with the birth of the calamity-howler there is also born a sucker, and both of them live far beyond their allotted time.

Ever since we began as human beings in this nation we have been cursed with the medicine men. We had them under barbarism and we have got them under civilization, and we are going to have them to the end of time. And perhaps the most dangerous of all these medicine men who have ever afflicted the human race are these men whom we call "parlor Socialists," and the other and still larger and more numerous citizenship whom we call "half-baked Socialists,"

What do they want? In the first

place, they want your property. Perhaps you may not have kept track of the radical press of this nation. Perhaps you have not been reading about the Farmer-Labor group, which has in its platform a demand for the socialization of not only the gas industry, but \$75,000,000,000 of private property.

A couple of years ago, I talked with a member of the Executive Board of the Farmers' Union in the State of Oklahoma, and I said to him, "What do you men want?" He said, "In the first place, you will agree that when the farmers in the country and the workers in the city unite together, we will be able to run this Government. Up to the present time, Wall Street has been running the Government, and we are sick of it, and we are going to take possession of this Government ourselves."

I admitted that would be true if they ever made that kind of a combination, but I said, "What do you want?" He said, "We want the U. S. Government to own all the mines, the railroads, the

*An address delivered before the Fifth Annual Convention of the American Gas Association, Atlantic City, October 15-19, 1923.

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telegraphs, telephones, and we want the State to own the stockyards, the cold storage plants. We want the citizens and the towns to own all of these public utilities, water power, and everything of that sort."

I said to him, "Let me come up and talk to your men this afternoon." He said, "No, we wouldn't allow anybody like you in our hall."

That is the way they feel about it, and that is the organization, that is the movement, that elected the Governor of the State of Oklahoma by 50,000 majority.

You have just had an election in the State of Minnesota, and there you have between 350,000 and 400,000 radical voters who want to take your property over into the hands of the Government.

It is a strange thing that they have that idea. They remind me of a couple of chaps by the name of Isaac and Jacob who went into business. They went into the fruit business. They didn't trust each other, so they both stayed around the fruit stand all day long and ate up all the fruit, and failed in business. Then they separated and each went his way.

Six years later they met. After congratulating each other upon his prosperous-looking appearance, Isaac said to Jacob, "What have you been doing all these six years?" Jacob said, "I have been making and selling patent medicine." Isaac said, "I have been doing the very same thing. Listen to this testimonial I have from a young lady." He pulled the testimonial out and it read like this: "I was born with my left leg three inches shorter than my right leg, and upon my right hand I didn't have any fingers at all. Since taking nine bottles of your Cure-All Medicine, my left leg has grown to its proper size and I have a

full set of fingers upon my right hand."

Jacob said, "That is pretty good, but listen to this testimonial I have." He pulled out of his pocket a testimonial from a young lady, which read like this: "I was born without liver or lights. Since taking six bottles of your Electric Bitters, I have a new liver and electric lights."

That is the kind of a Cure-All they have.

Now, this Farmers' Union that I spoke about is organized in thirty-five states. It has one million members. There are six millions of organized labor membership in this country, counting all of the various varieties, and they have taken official action everywhere, all over this country, in favor of the socialization of your property, all utility property.

They have voted many times to do this thing. I have had fights on municipal ownership from Maine to California, and I have yet to have a fight where organized labor didn't array itself solidly in favor of municipal ownership.

How do they carry on this fight? That is an interesting thing. Let me quote an editorial published in a number of newspapers which boast of the largest circulation in America. In the year 1915, before we entered into the war, the New York "American" published an editorial upon the German Empire and its railway system, which read like this:

"Before the war, the German Empire, one of the most expansive nations upon the face of the globe, derived one-half of all the cost of carrying on that great government through the ownership, the operation and the profits which it derived from the operation of its railways, its telegraphs and its telephones. If the German people can make two hundred and fifty million dollars a year profit

upon the ownership and operation of 33,000 miles of railroad, what could the United States do if they owned and operated 260,000 miles of railroad? We ought to do it anyhow, and if we did this thing we would secure cheaper rates, cheaper freight rates, and pay larger wages to the men who operated the railroads. So by right we should do this thing anyhow."

Now, you will agree that this is a very plausible editorial, and the only trouble with that editorial was that there wasn't a single word of truth in it, although it was published in a thousand newspapers in America, which reached a total circulation of more than 20,000,000.

If the Socialistic editor who penned that editorial had wanted to tell the truth about the German railroads as they existed in the year 1914, he would have said this—that the German Empire didn't own one single mile of railroad—that although those railroads were socialized, they were owned by their respective States in the same manner that New Jersey might own the Jersey Central Railroad, or the States of New Jersey and Pennsylvania might own the Pennsylvania Railroad System—just as the two States of Prussia and Essen owned the great Prussian-Essen Railroad.

If that Socialistic editor had wanted to tell the truth about those railroads he would have said this—that in the year 1914 it cost the German people 1-47/100 cents to get a ton of freight transported one mile, whereas we do the same job in this country at a cost of 71/100 of a cent per mile.

The German railway employee received an average wage of \$408.00 per year, as against \$810.00 per year paid to the railway employee of this country. And whereas the German people paid a

freight bill that year of \$502,000,000.00, if those same German people had enjoyed the cheap freight rates which prevail here in America, they would have saved for themselves that year \$250,000,000.00.

On the other hand, if the American people had been forced to pay that German rate for the transportation of freight in this country, your freight bill for the year 1914 would have cost you \$4,000,000.00 a day more than it did cost you.

That is the truth about the German railroads.

Or to put it in another way—while we were transporting 90 per cent cheaper than those German socialized railroads, we were paying double the wages to the men who operated those railroads.

And as for the telegraph and telephone, not one of them was ever able to make both ends meet. They have all been socialized over there across the water, and if you lived in Paris, Vienna or Budapest in the year 1914, or before the war broke out, and you wanted a residential telephone in your house, you would have paid an average price of \$77.70 per year, which is vastly more than you have to pay in the City of New York. And if you had lived in a little city the size of Atlantic City, you would have paid an average price of \$70.00 per year for your residential telephone and wouldn't have had any service on Sundays, holidays or after ten o'clock at night.

The German telephone system was losing three and a half million dollars a year, that of France was losing a million, eight hundred thousand dollars a year; and the girls who operated those socialized telephone systems of Europe received a wage that ranged all the way

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from \$2.68 per week to \$5.20 per week. How would you like to change places? How would you like to trade the system developed here under private ownership for that stagnated system over there?

Since 1870, the British telegraph has been owned and operated by the British Government, and it has become so demoralized and so slow that if you wanted to telegraph from London to some citizens in Liverpool, you would debate with yourself as to whether or not you had better walk between those two cities and deliver that message yourself.

The railways of Europe, which have been socialized for many, many years, are characterized everywhere by low wages, high freight rates, large annual losses and rotten service.

Switzerland, one the oldest republics in the world, has, within the past ten years, socialized and operated its railway system, and today it costs everybody five and one-half cents per ton to transport a ton of freight one mile in that country, as against a trifle over one cent per mile per ton in this country, and the wages here are a little more than twice as high as they are in Switzerland.

Now, I think perhaps Canada gives the best illustration of this theory of public ownership, because in Canada there were, up to the year 1914, three great railway systems that have been in operation for thirty-five years, two of them under private ownership, one of them under public ownership. The Grand Trunk and the Canadian Pacific had, up to that time, paid dividends to their owners, given splendid service to the people of Canada and paid millions of dollars in taxes to help support that Government.

On the other hand, the Inter-Colonial Railroad, constituting a system of 1741 miles of railroads, was built, owned and

operated by the Dominion. Into that white elephant the people of Canada had sunk, in appropriations, three hundred and eighty-five millions of dollars. If you extracted the entire value of that railway system from the sum the people of Canada had put in, you would learn that they had lost directly two hundred and sixty-eight millions of dollars and, in addition to that, they lost thirty million dollars more because if you and I had owned the Inter-Colonial Railroad, we would have had to pay taxes upon all that system.

The late James J. Hill, the great empire builder of the Northwest, said, "If I, and the men under me, owned the Inter-Colonial Railroad, we would make it the best piece of property on the North American Continent." Why? Because that stretches a thousand miles from the City of Montreal to the seaport at Halifax, St. John and Sydney. It runs through an extremely rich territory, it has a monopoly on the transportation of the coal mining from Nova Scotia and a like monopoly on the transportation of the products of the iron and steel mills of Sydney. Sydney is the Pittsburgh of Canada.

But that railroad has become known, from end to end of Canada, as "*Canada's white elephant*."

I went down over that road one time all the way to Sydney, and a farmer boarded the train at a little town, and I scraped up an acquaintance with him. He was a nice old chap. I said to him, "What's the matter with this railroad? Why do you call it 'Canada's white elephant'?" Why doesn't this railroad pay?" With a twinkle in his eye, he said, "Did you see the conductor come through here?" I said, "Yes. Fine, accommodating chap. Nice looking man." "Sure

he is a nice looking chap," he said, "and he is a politician. The man up in the engine is a politician, too. The man out on the track is a politician. You want to know what is the matter with this railroad? The men that operate the Inter-Colonial Railroad think more of getting the votes on election day than they do of getting the train in on time. That is the trouble with this railroad."

And that is the trouble with anything the Government operates. As a matter of fact, go around the world and you will learn that the Government requires two men and two days to accomplish that which private ownership will perform with one man in one day. That is an everlasting truth, to be proved everywhere.

Also up there in Canada is another illustration. For a few years the Province of Manitoba socialized the Bell Telephone System, and there was a little incident connected with that which illustrates this theory. The little town of Woodbridge owned a home telephone, but it didn't reach beyond the boundaries of that town. After the Bell System had been socialized and had lost about a half a million dollars, of which they were paying their part in losses, they resolved that they ought to have a line built to connect with the outside world, so after much agitation a meeting was held, and at this meeting resolutions were passed, saying that if connections weren't made the political party in power wouldn't get any votes on election day.

When you talk to a political party about votes, you touch a vital spot. So the political leaders conferred for a little while and finally, ten days before election, a freight train rolled into that town and two cars were set off on the siding, loaded with telegraph poles, and along

came a gang of workmen and unloaded those telegraph poles from that side track.

In about fifteen minutes everybody in town knew what had happened and everybody congratulated everybody else upon the fact that they were going to be able to talk with the outside world. So on election day they rolled up a smashing majority for the political party in power.

Ten days after election, that same freight train rolled into town again with two empty cars, put them on that same side track and the same gang of men loaded those telegraph poles on those cars and carted them out of town.

Now, I think you will agree with me that that is the first time you have ever heard of a great political party fishing for votes with telegraph poles.

If you went out of this hall tonight and met some socialist out there on the boardwalk and said to him, "That chap Gordon there is kind of ripping public ownership up and down the back. What do you think about it?"—do you know what his answer would be? He would say, "This is the trouble. The old political parties were in control in Switzerland, in Canada, in Germany, and all those other places, before the war. That is the trouble. If a labor party had been in power, if we had been in power, we would have run those railroads and telegraphs and mines, and so on, with great success."

And it is just because you have that kind of an answer, just because of that, you and I are going to take a little trip right now of five thousand miles. It won't take us but five minutes. We are going to a country which has made the most extensive plunge into State and Municipal Ownership of any other na-

tion upon the face of the globe. We are going to faraway Australia, and in that country we will find that the railroads have always been owned and operated by their respective States; likewise, the telegraph and the telephone. Over there, they not only own those public utilities, but they own the coal mines, the tin mines, they own ships that go out upon the sea and catch fish, they own wholesale and retail fish markets, they own slaughtering establishments, and they own wholesale and retail meat markets; they own hotels, they own farms, they own implement factories, and in the city of Melbourne they own a great factory devoted to the production of freight and passenger cars and locomotives for the socialized railway systems of that country.

One of the States owns thousands of acres of land upon which it raises cane—I mean sugar cane—and they own the factories that convert that sugar cane into sugar.

And because they have made that extensive plunge into State socialism, they have become the champion debt-ridden States of all the world.

You might say I was unfair if I told you that the debt of New Zealand at the present time amounts to more than five thousand dollars for every single family living there, but if you go to your Public Library and take from its shelves the statistical abstract issued by your Government annually, for the year 1915, before there were any war expenses, you will get from that book the facts which I am now about to cite to you.

On the first day of January, 1914, the debt of the Commonwealth of Australia and those States there amounted to one billion, nine hundred and thirty-six millions of dollars.

Upon that very same date the combined debts of the forty-eight States of America and our national government amounted to one billion, three hundred and thirteen millions of dollars.

Their debt over there was six hundred million dollars greater than our debt here, and we have twenty times their population.

How would you like to change places?

Let me put that in another way so that you can go out and tell your Socialistic friends about it. If, on the first day of January, 1914, every single family in America contributed the sum of \$65.00, that \$65.00 would have been sufficient to have wiped out all the debts of our forty-eight States and the federal government.

On exactly the same date, and by exactly the same process, if every family in Australia had to pay their proportionate share of their debt, every family would have had to go into their pockets to the tune of \$1,555.00 to have paid their State and National debt.

Sixty-five dollars here against \$1,555 over there! How would you like to change your system of private ownership to that of public ownership which they have in that great Democracy of Australia?

And then, again, over there, where they pay only half the wages we pay for the men who work on the transportation system, or the men and women who work in the telegraph or telephone system, or upon the street railways or the gas and electric plants—the cost of public service over there runs all the way from three to six times as much as it does in this country. It costs the farmer actually six times as much to get a bushel of wheat transported a mile over there as it costs us here in America.

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Why, it costs a man as much in Australia to get a bushel of wheat transported a distance of two hundred miles as it costs us to take a bushel of wheat in the City of Chicago and land it in the City of Liverpool, a thousand miles by land, three thousand miles by water.

And in that great Government factory at Melbourne, where they manufacture locomotives, sometimes they are unable to produce a sufficient number of locomotives, so they come up here to Philadelphia to the Baldwin Locomotive Works and buy one of those great Pacific type locomotives, load it on board and ship from Philadelphia Harbor. In the year 1914 they did that and sent it way down around Cape Horn, landed it in the City of Melbourne and saved eight thousand, one hundred and sixty-eight dollars by the operation.

How did they do it? They did it in this way. Under that blight of public ownership they have a new form of labor in Australia and that new form of labor is called "Government stroke." You can already guess what "Government stroke" means. "Government stroke" means that they do as few strokes as possible in a day, or an hour or a year. Consequently, in that Government machine shop, which is the finest system of a closed shop operated in all the world, it requires three men to do one man's job.

Now, we are not much better in this country, friends. I have had some experience in that, and I am going to take two minutes to tell you about it.

In the year 1907, when the late Colonel Roosevelt was President of this country, they passed a law, relating to immigration, known as the "1907 Act." I happened to be the first man in this country appointed to office under that new law.

After two years in Washington, they divided up the country into sections and gave me the New England States to look after. I didn't have much to do. I was working as hard as possible in order to find three days' work to do in the week, although I was drawing seven day's pay, and I was praying good and hard that the job might last the rest of my lifetime.

After I had held down that New England job for about three months, I read in the paper one morning that Mr. George Sheehan, a fine, capable young man of the City of Boston, had been appointed as an Immigrant Inspector to help me do my job. After George had trained around with me for three weeks, he was then able to perform the work alone, and then George and I were in a situation where we were doing less than two days' work in a week and drawing fourteen days' salary—and I am telling you my praying qualities suddenly increased enormously.

That is the way the Government everywhere does business. You could no more expect this government, or any other government on the face of the globe, to run a gas plant, an electric light plant, a coal mine, a steam railroad, or any other kind of an industry successfully and economically, than you could expect a bowlegged girl to get married in the town where she was born.

Men of the gas industry—if after the next Presidential Election you woke up and found, the morning after election, that the Farmer-Labor Party in this country had polled eleven million votes and sent one hundred members to Congress, you wouldn't be concerned with any questions about the distribution of gas or how to produce it cheaper, you wouldn't be indulging in expositions or

anything of that sort—you would be burning the midnight oil in order to learn ways and means of combating such a movement as that.

Yet in that great Democracy of Great Britain, in the last Parliamentary Election, the Labor Party, which has in its platform nothing hardly except public ownership, with the exception of one plank which demands the confiscation of property—that political organization polled four and a half million votes and elected a hundred and forty-two members of Parliament. They only have 44,000,000 of population over there as against 110,000,000 here, so that if we had a labor movement over here relatively as strong as that British Labor Party is over there, you would find a hundred members in our House of Representatives, many Senators in the Senate, and a total vote of 11,000,000. So that would cause you to sit up and do some pretty tall thinking.

My time is already exhausted. This is a serious thing, gentlemen. When you have got six States in the northwest that have a million and a half of radical votes—when you have got six States in the northwest that you don't know whether the Democratic Party or the Republican Party or both combined, will stand a chance of carrying them in the next election or not—you have a pretty

serious thing on hand, you have a pretty serious thing to face.

And so I say to you that this political movement known as the Farmer-Labor movement in some States and the purely Labor movement in others—I say that movement is not diminishing, but it is growing, and it is growing because men like you have not taken the opportunity to organize and meet that gigantic force which is spreading from end to end of this country.

And so my last appeal to you is this—that this is your country, you haven't got any other country to go to. There are no more new continents that can be discovered anywhere. More than four hundred years ago the great Columbus, sailing across the wide and mysterious seas in search of a passageway to India, discovered America. We cannot make much further progress to the North, because of the cold and inhospitable climate; neither can we go to the South.

So here upon this continent, made sacred by the blood and the sacrifices of the fathers who handed down to you and to me the finest system of Government the sun ever shone upon, there was also handed to you and to me this supreme duty of seeing to it that this great Republic does not perish from the face of the earth.

The Bulletin of Abstracts

How many trade journals do you have time to read? After reading an article that appeals to you, are you able to locate it again when wanted, or have you forgotten the name of the magazine, or the date of issue?

The Bulletin of Abstracts makes it possible for you to locate any article or data of interest to a gas man that has appeared in the domestic or foreign trade papers. Printed in loose-leaf form, indexed by subjects and ready for instant filing, these Abstracts are invaluable to every gas man. They save time and effort and insure your library being complete on all gas and correlated literature.

They are published every two months and the yearly subscription is only \$5.00. Now is the time to send in your subscription for this valuable service so that you will start with the new volume issued January 1st.

Connections for Circulating Gas Water Heaters Now Standardized

N. T. SELLMAN

THE DIVISION of Simplified Practice of the Department of Commerce called a meeting of range boiler manufacturers in Washington on October 29 and 30 of this year. At this meeting preliminary discussions were held to consider the possible standardization of gas water heaters, combination boiler and gas water heaters, hot water storage tanks and pneumatic tanks. Due to lack of proper representation it was considered advisable to refer the questions relating to gas water heaters back to special committees comprised of gas water heater manufacturers. The sub-chairman of these committees were selected from those present and were as follows:

E. J. Horton, Ruud Mfg. Company (Automatic storage water heater tanks).

Arthur Friedman, The Cleveland Heater Company (Gas water heaters, side arm type).

S. J. Lonergan, Bastian Morley Company (Combination boiler and gas water heaters).

The writer was requested to serve on these committees in order to coordinate their work with standardization activities of the A. G. A. This is important as the subject of gas water heaters is now before the Standard Specifications Committee and will be one of this year's major undertakings.

The next question to come up for discussion was a proposal that all side

tappings be eliminated from vertical boilers and that three holes be tapped in the top instead. After considerable discussion the advisability of the side tappings was acknowledged so that the final resolution passed by the range boiler manufacturers, who represented 90 per cent of the range boilers manufactured in the United States, was substantially as follows:

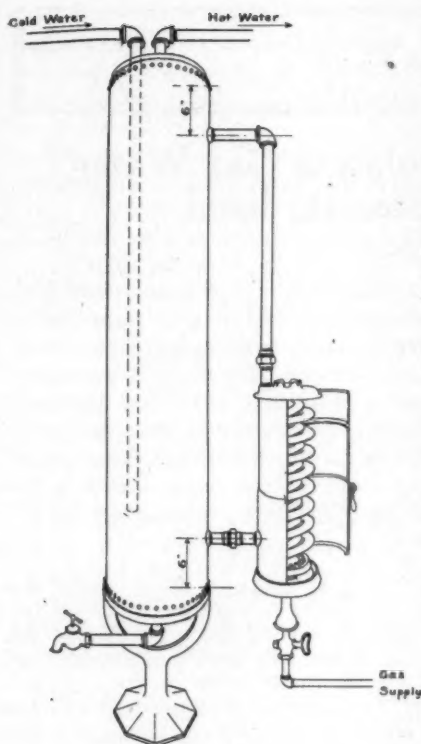
"That all standard range boilers will in the future be equipped with two side tappings, one located 6" from the top edge of the side sheet and the other 6" from the bottom edge.

"That the boilers be equipped with the customary two top tappings and one bottom tapping.

"That all tappings be for 1" standard pipe.

"That all the manufacturers present take immediate steps to readjust their equipment to meet this new standard and that by July 1st, 1924 it will be the only standard listed by the manufacturers for sale to the trade."

Gas men that have given serious thought to the subject of water heating have sooner or later come to realize the many advantages of the side connections for circulating heaters. In fact this type of connection is used exclusively by some companies today, even though it most often necessitates tapping a tank on the consumer's premises and then using special adjustable brass spuds for com-



pleting the threaded outlet. The fact that all tanks will in the future be supplied to the trade with the desired tapings should therefore be welcome news to the gas industry.

It hardly seems necessary to extol further the merits of the side connections but for the benefit of those who have not given this subject much thought the following facts should prove beyond question the advisability of standardizing on the two side tapings.

(a) It prevents water from short circulating through the heater and thus often causing cold or lukewarm water to reach the hot water outlets although the tank is partly filled with hot water.

(b) It provides for freer circulation of the heated water from the gas heater to the tank. This results in a larger volume of hot water at a moderately warm temperature as against a small volume of excessively hot water.

(c) It will make the heater operate with a higher thermal as well as circulating efficiency because, due to the freer water circulation, the heat transfer and absorption will be greater.

(d) It will prolong the life of the storage tank and all hot water pipe as the free circulation will prevent overheating of the water. This is true because the hotter the water the more powerful is its corrosive action. With the side connection overheating will only occur if the heater is left burning long after the tank is completely filled with water at a sufficiently hot temperature for any domestic purpose. The old type of top connection will even under the most favorable conditions require higher temperatures to start circulation and in many cases temperatures close to the boiling point are necessary.

(e) It provides for a large chamber in the bottom of the tank where all sediment may collect. Even if the tank is not systematically cleaned out, there will always be clean water at the inlet circulating connection to the heater. This will prolong the life of the heater and maintain its efficiency.

(f) It provides a more substantial support for the heater, thereby eliminating the necessity of a direct floor support.

(g) It makes a simpler pipe fitting problem than any other type of connection, thereby reducing installation labor cost.

(h) It requires less pipe and fittings, thereby reducing material cost.

With all these advantages and no offsetting disadvantages it is evident that we should all favor this method of connection, particularly when it actually means a better and safer installation at a lower cost. It developed at the Washington meeting that the plumbers and jobbers

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are in full accord with the gas industry in favoring the side connections. In view of this it is quite remarkable that but few tanks have previously been tapped in this way. It is always difficult to change an old custom or standard and we were indeed fortunate in having the four trades together at one time that were necessary in order to accomplish this change.

The tank manufacturers estimated that the two side tappings may add approximately twenty-five cents to the cost of the tank. This was not certain, however, as it was predicted that the reduction in stock sizes that will be carried in the future may reduce manufacturing costs enough to offset the cost of the taps. The plumber's representative was of the opinion that the side tap is equally beneficial for waterback connections and gas heaters and that in any event the installation cost would be considerably lower.

With the present tanks having two top tappings and one bottom tap it will cost about five dollars for material and five dollars for labor to make a side tap connection with the use of the adjustable spuds. The new standard tank will reduce this installation cost about fifty per cent. If we allow that there are 350,000 tank heaters sold a year, of which 250,000 are for new installations, it will produce a saving of \$1,250,000 a year to the purchasers of tank heaters. The saving due to increased efficiency and longer life of heater, tank and piping

is difficult to evaluate accurately but it is conservative to claim an annual saving of 20 per cent in favor of the side connection as against the top and bottom tap. In comparison to some common types of top connections this saving can be realized on the gas consumption alone.

The foregoing explains why and how this standardization came about. Now I wish to explain what part the gas companies must contribute towards bringing this standardization to an early and satisfactory conclusion.

Our first duty is to let the tank builder realize that he has not made a mistake in complying with our wishes and that there is a real demand for this type of tapping. This can only be done by impressing upon the jobber, plumber and consumer the merits of the side connection so that they in turn will demand the new standard.

In order that the American Gas Association can assist gas companies in creating this demand we will have ready for distribution in a few weeks a placard which will be suitable for free distribution to plumbers, whereon we will illustrate the proper method of installing circulating water heaters as well as other instructions regarding adjustment and operation of this type of heater. These placards will be sold at cost and a sample copy mailed to all company members with a letter suggesting that they be distributed to all local dealers in gas heaters as well as plumbers.

Report of the Committee on Customer Ownership*

CHARLES A. MUNROE, Chicago, Ill., Chairman

YOUR COMMITTEE on Customer Ownership was gratified and surprised to learn of the great interest shown in this subject by the member companies. Up to the time of preparing this report, 187 replies to questionnaires had been received. These replies have been summarized and attached to this report.

During the period covered by the questionnaire, which was the year 1922, and the first eight months of 1923, there was sold by gas companies 550,708 shares of stock to 107,094 purchasers. There were sold by combination gas and electric companies in the same period, 700,932 shares of stock to 120,076 purchasers, or a grand total of 1,251,640 shares of stock sold to 227,170 purchasers. The average number of shares of stock purchased by one person was 5.50 shares. The aggregate amount of money received from these sales was \$106,836,000.

This vast sum of money was obtained at a cost so low as to be heretofore unknown. The financial structure of the companies has been improved by strengthening the position of the senior securities, and in addition what it means to this industry, in the way of better public relations, to have upwards of 225,000 investors interested in the business cannot even be calculated.

The most satisfactory way to acquaint our customers with the problems of our business is to have the customer an owner in the business. Many of the difficulties of the past will be avoided

through a better understanding of our business, brought about through customer ownership, and a sure antidote to municipal ownership is ownership by the public of our securities.

To the companies who have not yet undertaken the sale of securities to their customers, the Committee submits as a suggestion the plan of one of the large companies which is working successfully:

(1) The sale of stock is for cash or on time. If on time, \$10.00 per share is obtained at the time the customer signs the contract and \$10.00 per share per month until the final payment is made.

(2) Interest at 6% per annum is allowed on all payments made where the stock is sold on the deferred payment plan.

(3) Commissions:

<i>Cash Sales</i>	
1 share	\$ 2.50
2 "	4.50
3 "	6.00
4 "	7.00
5 "	8.00
Excess shares up to 50 shares, per share	1.00
Excess beyond 50 shares, per share	.25

<i>Deferred payment sales</i>	
1 share	\$ 2.25
2 "	4.00
3 "	5.25
4 "	6.00
5 "	6.75
Excess shares up to 50 shares, per share	.75
Excess beyond 50 shares, per share	.25

(4) Balance paid within 30 days on any one sale, constitutes a cash sale.

(5) Where stock is sold on the deferred payment plan and the purchaser

*Report read at the Fifth Annual Convention of the American Gas Association at Atlantic City, Oct. 15-19, 1923.

is in default before three payments have the rest of the market, in accordance with the cost of money.

(6) No promise is made by the company that it will give back to the purchaser the price paid for the securities. The cost of money determines the price of all securities including the obligations of the United States Government, and it would be unnatural for the securities of a public utility not to fluctuate with

(7) No promise is made by the corporation to buy back the security. (Provision may be made to either oversell the issue, or continue from time to time the sale, in order to provide a ready market for the securities.)

(8) Payments on defaulted contracts are returned after an effort has been made to get the purchaser to continue to finish his payments.



Block that Kick! Itemize the Bill!

THE DOCTOR SENT a bill for ten dollars to the terrible tempered Mr. Bang. The bill read, "Two visits—ten dollars."

"You're a robber," said Bang. "Five dollars a visit! It isn't worth it."

"I'll rewrite the bill," said the doctor, and Bang smiled. They couldn't put anything like that over on him.

Then the doctor wrote: "To getting out of bed at 2 a. m.; answering phone; disturbing wife; dressing; going to garage; cranking tin Lizzie; two-mile drive in the cold; SAVING BABY'S LIFE; return to garage; waking wife; undressing; getting back into bed—ten dollars."

He said to Bang: "I won't make any charge for the second visit and you need not pay for the first unless you feel I have earned the money."

Mr. Bang paid the bill.

Sometimes we don't pay willingly because we don't realize just what we get for our money.

Touching on this subject, the Peoples Gas Club News, published by the Peoples Gas Light & Coke Co., of Chicago, says:

"If all the gas companies in the coun-

try could only send, for just one month, to every customer a detailed bill of services rendered, it would be one of the biggest things that ever happened to the gas industry. It would mean more good will, more gas consumed, and the sale of more gas appliances.

"Can you imagine a customer getting an itemized statement that began like this:

"To saving baby's life when she became suddenly ill in the night and it was necessary to heat water quickly.'

"To carrying out ashes for one month.'

"To carrying in coal and kindling for one month.'

"Suppose there were a string of items like this and the charge for all of them in the neighborhood of \$2.40? Wouldn't there be a new attitude toward the gas bill? Would there be so many housewives remarking, 'I didn't want to light the gas?'"

Sometimes it is necessary to be explicit if you would have people know you're fair.—*Indiana Committee on Public Utility Information.*

News From Our Affiliated Associations

From the Eastern States Gas Conference

Arrangements have been completed to hold the 1924 Meeting of the Eastern States Gas Conference, the first and only Geographic Division of the A. G. A., at the Bellevue-Stratford Hotel, Philadelphia, instead of Atlantic City, on April 9th and 10th, 1924. The great success and large attendance at the last conference, coupled with the activities of the State Associations who are members since that time and the large increase in their membership, may be taken as an index to a very successful meeting of the Gas Conference this coming spring. Mr. W. H. Pettes is the Chairman of the Paper and Program Committee and Mr. C. E. Bartlett heads the Arrangement and Entertainment Committee.

The Mid-Year Meeting of the Pennsylvania Gas Association will be held at Bethlehem, Pa., on Thursday, December 13th. Messrs. H. H. Ganser, Geo. B. Bains, 3d, and W. Griffin Gribbel comprise the Program Committee; Messrs. John A. Frick, J. Ward Crankshaw, and J. C. Smith make up the Mid-Year Meeting Committee, with Messrs. C. E. Bartlett and Stanley Grady taking care of the entertainment features. This will be a one day session with papers contemplated on the following subjects: House Heating and Industrial Gas, Standardization of Resale Price on Gas Appliances, Bituminous Coal as a Generator Fuel, and Public Relations.

From the Wisconsin Utilities Association

The Accounting Section of the Wisconsin Utilities Association held a very successful two day meeting recently at Madison, Wis. The program arranged by Executive Secretary John N. Cadby was an interesting one with entertainment features provided in the way of automobile trips and a dinner dance. The following papers were read "Accounting and Public Relations" by Mr. E. A. Davis of Chicago, "Collections and Public Relations" by Mr. Stephan A. Bialecki of Milwaukee, "Bookkeeping without Books" by Mr. Drallmeier, and "Education of Women Employees" by Miss R. E. McKee, of Chicago. The committees of particular interest to the Accounting Section made reports during the meeting. An interesting feature of the program was provided in the Echoes from Atlantic City Convention, the leaders telling about the meetings, exhibit, and other features of the 1923 A. G. A. Convention.

The Southwestern Public Service Association

On September 26, 1923, the Executive Board ratified an affiliation agreement with the Southwestern Public Service Association. This Association is now one of the oldest and strongest of the state and district associations having been organized May 22, 1895, under the name of Texas Gas & Electric Light Association. The South Central Gas Association, formerly affiliated with the American Gas Association, merged with the Southwestern Public Service Association last May. The latter has a full time Secretary, Mr. E. N. Willis, who is very much on the job and doing great work for the industry in that part of the country covered by his Association, Texas, Louisiana, Arkansas, Oklahoma, and New Mexico. Mr. C. B. McKinney of the Municipal Gas Company, Dallas, Texas, is the Chairman of the Gas Section of this Association. Both Mr. McKinney and Mr. Willis attended the Convention.

From New England

The Annual Convention of the New England Association of Gas Engineers will be held at the Copley-Plaza Hotel, Boston, during February, 1924. The exact dates will be announced later.

ACCOUNTING SECTION

W. A. SAUER, Chairman

H. C. DAVIDSON, Vice-Chairman

H. W. HARTMAN, Secretary

Proposed Activities of the Section for 1924

DURING THE ASSOCIATION'S year just closed, the Accounting Section, through its several committees, made many contributions of prime importance to the industry. The work of many of these committees will be continued during 1924 for the purpose of securing the most comprehensive study of and recommendations on the subjects which they cover.

Uniform Classification of Accounts

During the past year the number of State Commissions to adopt the Uniform Classification have been increased from five to eleven and some eighteen additional Commissions either have its adoption under consideration or have indicated an intention to do so shortly. This was brought about, in a good measure, by the appearance before hearings, etc., of representatives of this Committee in a constant endeavor to stimulate action on this question by the local authorities. This important work is to be continued during the coming year in an endeavor to secure further adoptions.

Insurance Committee

This committee's work and advice on the application of the new rating schedule for fire insurance has resulted in re-ratings on gas plants showing a 25 per cent saving in premiums and in some cases as high as a 50 per cent saving. In addition, they have instituted the collection of statistics in fire losses with a view of seeking further reductions. This

latter work will be actively pursued during the coming year and in addition they will make a similar study of liability insurance.

Customers Accounting

This committee will concentrate on the further adoption of the system of Book-keeping without Books and the economies resulting therefrom. This work is to be actively continued during the coming year in an endeavor to secure the maximum economies in this work for the varying diverse situations presented.

Relations with Customers

The important work of this committee will be continued for the purpose of securing the maximum beneficial effects on public relations which may be attained through the contact of the employees of the commercial offices with the customer. This study of the part which these employees play in developing proper public relations is one of vital importance.

Committee on Analysis of Gas Company Statistics

This is a new activity proposed and is designed to bring out the salient points susceptible of statistical presentation whereby each company can inform itself as to trends and developments affecting policies of management, etc., from a study of its own figures.

In addition to the above-mentioned work, the committee on Budget will be continued throughout the ensuing year.

Report of the Insurance Committee

DURING THE FIRST two years of the activities of this committee, its work was devoted to a reduction of fire insurance rates on gas plants. The scope of the committee was extended, however, this year to embrace all forms of insurance.

The general application of the new schedule of fire insurance rates on gas properties was made during the past twelve months, and it is now apparent that the new rates have effected a considerable saving to member companies. In the September issue of the A. G. A. Monthly there were published certain statistics showing the savings obtained by twelve member companies, and the ratio of these savings to the amount of dues paid for membership in the American Gas Association. This ratio runs from 43 per cent in one company to 585 per cent in another. With the exception of the company having 43 per cent, all obtained savings equivalent to their dues, and, in practically all cases, more than the amount paid. These figures are repeated here as a matter of further information:

Since the above information was completed word has been received of reductions obtained by several other companies making the total amount of savings reported so far over \$15,000. This amount represents actual savings reported by a very small number of company members. So few companies have reported on the subject that we feel assured the sum quoted represents but a small part of the actual savings obtained.

It seems proper at this time to emphasize the value of membership in the association, because, if the work of one committee produces such tangible results, it is not unlikely that other committees are doing even more valuable work, which benefits member companies equally as well. The committee feels that further reductions are still obtainable, inasmuch as the loss ratio for the year 1922 was very low. Member companies, therefore, are earnestly requested to furnish insurance statistics as carefully and fully as can be obtained, in order that a strong case for still lower rates may be presented to the insurance interests at the proper time.

Company	Prem. Paid Prev. to Rerating	Savings in Prem. after Rerating	An. Dues in A. G. A.	Per Cent Ratio Savings to Dues
A	\$ 9,710.00	\$ 2,282.00	\$ 5,174.00	43
B	4,541.00	1,125.00	1,147.00	100
C	3,903.00	1,142.00	533.00	220
D	4,161.00	1,116.00	194.00	585
E	4,723.00	798.00	420.00	190
F	2,600.00	570.00	261.00	219
G	1,792.00	429.00	102.00	400
H	1,277.00	287.00	114.00	254
I	859.00	269.00	72.00	371
J	726.00	199.00	130.00	146
K	879.00	161.00	101.00	160
L	939.00	148.00	87.00	175
		<u>\$ 8,526.00</u>	<u>\$ 8,335.00</u>	

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According to information from the Central Traction and Lighting Bureau, which formulates the schedule applicable to gas plants, the following rating organizations have adopted the new schedule:

Board of Fire Underwriters of Alleghany County.

Underwriters Association of the Middle Department.

New Hampshire Board of Fire Underwriters.

New York Fire Insurance Rating Organization (except New York Fire Insurance Exchange).

Philadelphia Suburban Underwriters Association.

West Virginia Inspection Bureau.

Southeastern Underwriters Association.

Arkansas Fire Prevention Bureau.

Oregon Insurance Rating Bureau.

Arizona Equitable Rating Office.

Western Union.

New Jersey Schedule Rating Office.

Board of Fire Underwriters of the Pacific.

Although the Philadelphia Fire Underwriters Association has not adopted the schedule in its entirety, a 25 per cent reduction has been made in the old schedule and rating is based under this plan. Certain rating bureaus have not adopted the schedule but are using it as a guide. In this class are:

Association of Fire Underwriters of Baltimore City.

New England Insurance Exchange.

Boston Board of Fire Underwriters.

New York Fire Insurance Exchange.

Underwriters Association of the District of Columbia.

Insurance Association of Providence, R. I.

The schedule used in the state of Washington although not the one formulated by the Bureau probably produces

rates as low. The state of Texas formulates its own rates and has no company-managed rating bureaus. In Kansas and Mississippi insurance is in a rather upset condition and there has been so much litigation that the companies are not in a position to attempt to file or apply the schedule.

Frequently local agents or brokers do not desire to press the adoption of this schedule because it may mean a reduction in the amount of premium they will receive; the utility then hesitates to insist upon its adoption because of certain friendly relations with these agents. If such is the case a direct appeal to the rate-making bureau by the utility or by the Insurance Committee on behalf of the utility will undoubtedly bring about the desired results.

If there are any localities where the new schedule has not produced the desired results the committee will, if requested, have the situation threshed out by the Central Traction and Lighting Bureau, the formulators of the schedule. In several instances, member companies have written to the committee, and when these individual cases have been called to the attention of the officials of this bureau, beneficial results have been obtained. The committee wishes to express publicly its appreciation of the assistance and courtesy extended to it by the President of the Bureau, Mr. H. A. Smith, and his assistants. The insurance companies have also co-operated in an endeavor to have the various local rating organizations adopt the schedule as quickly as practicable. The officials of the insurance companies have been eminently fair, and as the insurance companies and the utilities have many interests in common, close co-operation will be of mutual benefit.

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The committee again desires to bring to the attention of the member companies the new explosion clause which may now be attached to policies covering gas plants. Under this clause the ignition of gas, resulting in an explosion is regarded as a fire, and the resultant damage should be treated as a fire loss, and reimbursement obtained from the insurance companies. The explosion clause formulated by the Bureau is as follows:

Inherent Explosion Clause

"In consideration of the rate at which this policy is written, this insurance shall cover any direct loss or damage to the property insured hereunder caused by explosion resulting from the hazards incident to the business as conducted therein and occurring in the structure (or structures) or containing the property insured hereunder, not exceeding the sum insured, nor the interest of the insured in the property, and subject in all other respects to the terms and conditions of this policy. If there shall be any other insurance on said property, this company shall be liable only pro rata with such other insurance for any direct loss by explosion, whether such other insurance be against loss by explosion or not.

"Liability is excluded for loss or damage occasioned by or incident to the explosion or rupture of steam boilers and (or) fly wheels and their connections."

This clause has not been adopted generally throughout the country as there are some states in which laws operate against its use to a certain extent. However, it is believed that practically every company may obtain this clause or the one quoted below:

"It is expressly understood and agreed that, in construing the terms and conditions of this policy, the ignition of gas in or about the premises described herein shall be regarded as 'fire' and the loss

resulting therefrom shall be adjusted and paid in the same manner as if otherwise occasioned and also that all conditions contained in other paragraphs hereof restricting the generating of gas and storage and use of naphtha and fuel oil and other inflammable or explosive materials are hereby waived."

The value of the explosion clause has not been fully appreciated, and members should see that it is made a part of their policies. If not already on the policies, brokers or agents should be requested to endorse it thereon. The committee will be glad to furnish any information desired regarding it, and will co-operate with member companies to obtain either of these clauses.

As one of the main requisites of the gas utility is continuity of service, prevention of fires and protection against the consequent disruption of service should be one of the chief aims of the industry. As an aid to the proper maintenance and protection of gas plants, the committee has spent considerable time in preparing a self-inspection blank for the use of plant managers or superintendents. A few copies of this form are available now and if there is a demand for it, Association Headquarters will have it printed and distribute at cost as many copies as are requested. This blank will be found useful in pointing out conditions which have caused fires in the past, and which, if found in any plant, may cause a serious fire, and the inevitable interruption of service.

The record of fire losses in the gas industry has been uniformly low and based on this favorable condition the rate reduction was obtained. In order to maintain these low rates and possibly obtain a still further reduction to which it is felt the industry is entitled a continued and active interest in fire preven-

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tion and fire protection is absolutely necessary. This desire to prevent fire losses should manifest itself in building construction approaching nearer to the standards as approved by the underwriters and a continued attempt to improve present physical conditions. A careful study of the inspection blank provided by the committee and the enforcement of the regulations set forth will undoubtedly bring about considerable reduction of fire hazard.

The committee this year has devoted considerable time to the study of rates for workmen's compensation and public liability insurance in the gas industry. Preliminary information obtained as to the ratio of loss to premium has justified us in requesting the bureau formulating these rates to consider a reduction. It was hoped that the necessity of a questionnaire to member companies seeking information necessary to present our case would not be required. As the insurance companies must be convinced by actual figures it will probably be found necessary to obtain this information. In view of the saving to be obtained it will be of benefit to all members if such a questionnaire is returned promptly and with complete information if sent out. The committee regrets that such a step is necessary, but has no other means of obtaining the desired data. Compiling the resultant statistics is difficult, and the committee is desirous of avoiding the use of the questionnaire also.

The attention of members is directed to a new form of insurance, which has recently appeared, known as property damage. By means of it, liability for damage to property of others may be

covered. Little information is as yet obtainable regarding it, but it is intended to cover, it is believed, such disasters as the recent explosion in Springfield, in which neighboring property was considerably damaged. A study of this form of insurance will be part of the program of next year's committee.

Your committee earnestly recommends that member companies give more serious thought to insurance in its many forms. It has been noted that the best results in reduction of insurance costs, prevention of losses, and protection of stockholders' investments are attained by those companies whose insurance affairs are under the direct supervision of an executive. A thorough study of the insurance conditions in a company will not only produce savings, but will provide against casualties and losses and the consequent irritation of disrupted service.

As the protection of valuable records is of vital interest to all, and especially to the accountant, the committee directs attention to the very excellent report of the Committee on Preservation and Destruction of Records, of the Accounting Section of the National Electric Light Association. The absolute necessity for properly safeguarding all essential records is stressed. Expert fire protection engineering advice obtained from outside sources is presented, explaining the best methods of safeguarding valuable records. Those who have not read this report are urged to study it carefully, and follow its advice. Some recent fires have impressed upon the minds of many how irreparable a loss may occur where records are not properly safeguarded.

Side Lights on the Accounting Convention Sessions

THE 1923 CONVENTION sessions of the Accounting Section yielded many gratifying indications of the increasing interest and results which are being secured in this branch of the Association work.

To say that the four hundred members present broke all previous attendance records is to tell only a small part of the story. The character of this attendance, their interest and enthusiastic discussion and the actual accomplishment recorded as a result of the past year's work were the most gratifying and tangible indications that the Section's growth is proceeding along solid and constructive lines.

Accounting Section Exhibit

Official attendance records show that

some three hundred and fifty members attended the Accounting Section Exhibit Booths and took in the working demonstrations of Billing Machines, Merchandise Accounting and "Bookkeeping Without Books." The bound sets of gas company forms and work tickets (a feature of the exhibit which proved most interesting to visitors at the booth), are now on file at Association headquarters and available to members.

Seven More States Adopt Uniform Classification of Accounts

During the year, seven additional state commissions have adopted the Uniform Classification and it is now under consideration in eighteen others. Since the Convention, Association headquarters have been advised that the State of



Georgia has adopted the classification making it effective to date in the following States: Alabama, Georgia, Colorado, Illinois, Indiana, Massachusetts, Michigan, Nevada, North Dakota, Tennessee, Utah, Virginia, Wisconsin and Wyoming.

Customers Accounting

Twelve different companies of varying size and location reported adoption of the system of "Bookkeeping Without Books" with entire satisfaction from a service standpoint and with economy of time and money. Annual savings of \$8,000.00 and \$5,000.00 were reported by two companies as a result of adopting this system and another placed their savings on the basis of \$40.00 per thousand meters per year. When it is considered that Customers Accounting frequently represents ten per cent of a company's total costs, the study devoted to this subject and tangible economies effected appear well worthwhile.

Insurance Committee

The report of this Committee is published in full on another page. Official reports to the Committee indicate annual premium savings by gas companies of \$15,000.00 under the Insurance schedule secured by the Committee. This represents only the few companies reporting to the Committee and probably is only a fraction of the total savings effected.

Sidelights on the Discussions

The report on Relations with Customers developed a lively discussion of credit policies:

To what extent should deposits be required?

Should they be voluntarily refunded and when?

Should guarantors be accepted and should their liability be limited as to time?

Extremes of practice were indicated by one company that required deposits on *all* accounts and another that required no deposits except on certain commercial accounts.

The Committee's recommendation to eliminate guarantors met with general approval.

A wide range of practice and opinion was indicated on the question of refunding deposits involving difference in local conditions affecting collection of final bills.

Satisfied Employees and Labor Turn-Over

Development of personnel was discussed largely from the standpoint of reductions of labor turn-over through proper remuneration, promotion from the ranks, profit sharing and pension systems for employees. Proper relations with employees were accentuated as the first step to good service and relations with customers.

High Bill Complaints

Because his high bill complaints were only two-tenths of one per cent of his accounts one member felt that something should be done to increase them. The danger he felt was not in the complaints received, but in those customers who failed to complain but merely curtailed their use of gas. This brought out the following practice of companies to encourage legitimate complaints:

1. Post cards sent out very three months asking customers to report any imperfect service and itemizing causes of complaints.
2. Checking monthly bills against prior ledger accounts and sending inspectors

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out to investigate any unusually high or low bills before presentation.

3. Periodic voluntary inspection of appliances.

Moral: It sometimes pays to anticipate trouble.

Nominations

The occasion was not without its intimate touches. Upon presentation of the Nominating Committee Report, Mr. Brundage rendered the following touching tribute to J. Wesley Heins and William A. Sauer, retiring Chairman and Vice-Chairman of the Section:

Watchful Wesley and Wistful Willie have closed their year with glory, Wesley carefully watched our affairs, but Willie watched another story.

Wesley stayed on the job all year and saw our Section through, But Willie, he wandered Europe o'er to see what their gas men do.

Wesley you have done mighty well to close your year with glory,

May memory of it all remain, until your head is hoary,

Willie you've had a grand good time where prohibition is unknown,

But now you're back to work again, we'll put you on the "Throne."

♦ ♦ ♦

Among Those Present

THE OLD adage that great minds think alike seems to have been well established at Atlantic City during the week of October 15 to 19, and a few days before and after that time. For not only did the gas men elect to meet there in large numbers, but so did the Presbyterian Ministers, the Rabbis, the Telephone Pioneers, the 29th Division, the Hardware Men, the Knight Templars of New Jersey, the Junior Order of Master American Mechanics and several others whose nomenclatures escape the memory.

How to get the news happenings of these various meetings printed in America's newspapers was the job confronting the respective publicity men. It was an interesting experience to see whether news regarding the gas industry could hold its own when pitted against the more colorful copy emanating from the Rabbis, the Hardware Men and the others.

The gas news won out. But not because it was novel, humorous or particularly well written. It won out because the American people are directly interested in matters concerning fuel and its utilization. The press correspondents at Atlantic City know this. That is why the telegraph wires carried thousands of words of actual news matter concerning the gas industry and its present problems and opportunities.

♦ ♦ ♦

PUBLICITY AND ADVERTISING SECTION

J. M. BENNETT, Chairman

F. L. BLANCHARD, Vice-Chairman
CHARLES W. PERSON, Secretary

Public Utility Advertising*

JOE CARMICHAEL, Director, Iowa Committee on Public Utility Information

I AM VERY GRATEFUL to your president and secretary for giving me this opportunity to talk to you on public utility advertising and explain something of the work of the Committees on Public Utility Information in this connection.

I may say at the start that these Committees are not essentially advertising bureaus. They are just what their name implies, committees on public utility information. But they found at the outset that one of their most important functions, if their work was to be effective, was to help to establish the industries they represent on a sound economic basis so far as publicity is concerned.

They realized the justice of the earnest and forceful campaign which the Inland and other press associations are making against the fake publicity graft, and were determined that their work should be freed from any such stigma.

These Committees do not consist merely of directors and office assistants. We are merely the hired men employed to execute the plans of the organization. The men who formulate the plans and direct the activities of the Committees are the big, busy men in the utility industry, company and syndicate heads and executives, who gather regularly, usually once a week, from all parts of the state and devote a day or part of a day to this important work.

These Committees are a new feature

of public utility operation. The first one was organized here in Illinois less than five years ago. There are now Committees in 34 states and two others are being organized. We hope that every state in the Union will be so organized in another year.

The organization of these Committees is a direct result of a complaint that the public utilities were too secretive, that they refused to give out information regarding their activities. The complaint many times came from shifty politicians and other opportunists, who tried to gain political control by attacks on public utilities. They too often succeeded because the public knew too little of the operation of the utilities which so vitally affected them.

But all the criticism was not from the demagogues. There was also honest, constructive criticism from the friends of the utilities, from people who knew something of their problems, but who were convinced that the general public knew too little about them.

Trinity of Service

Wise utility executives realized that three things were necessary if the public utility industry were to thrive.

They must give the best possible service.

They must give this service at the lowest possible cost.

And, they must tell the people.

*Address delivered before Inland Daily Press Association, Chicago, Ill.

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There is an honest effort to give good service. No thoughtful man after careful consideration can deny this. The public utility companies of the United States, and for purposes of this talk I am confining my remarks to the electric light and power, the electric railway, the gas and the telephone industries, are spending billions of dollars each year improving their service.

They are providing new machinery, developing new water power projects, extending their transmission line systems and interconnecting generating stations in order to decrease the possibilities of interruption of service.

In Iowa alone we have 6,500 miles of transmission lines connecting towns, most of them served by two or more generating stations, so that in case of accident to one, service from another is instantly available.

If it were not for these improvements and economies in operation, the cost of this service to the consumer would have soared to the altitudes reached by other articles on the family budget instead of actually decreasing. For the utilities had to pay increased prices for what they bought, the same as you publishers.

And these utility officials knew that if their field was to be properly developed they must keep the cost of their product down. There are millions of homes to be electrified, many thousands of factories and many new uses to which this service can be applied. There is probably not a company in the country but what has a waiting list of prospects, whom they can land every time they are able to reduce rates.

But these utility executives realized that it was not alone necessary to give good service at reasonable rates. They must tell the people about it, because no

industry is so vitally dependent on the understanding and good will of the people as the utilities, which are regulated in almost every action by legislatures, commissions, city councils and courts.

They are dependent on good will also because they are the most constant borrowers of money in business. Their business is built on borrowed capital.

They can borrow only from the public, represented by the banks and insurance companies, and from others who have accumulated savings, and invest them in the stock of these concerns. Some of you men may have had occasion to borrow money for your business from time to time, and you know that you can't get it at any reasonable rate if your credit is not good, no matter how important politically or how powerful socially you may be in your community.

Tackling the Problem

Realizing this, these utility executives organized the Committees on Public Utility Information for the purpose of cultivating closer and more friendly relations with the public.

They employed as Directors of these Committees, men from the editorial and advertising departments of the great dailies. As successful newspaper men, these Directors knew as well as other newspaper men something of the difference between news and advertising. They had had plenty of experience with press agent grafters, from those employed by Uncle Sam himself, down to the oil stock promoter.

They knew that with the reputable newspaper, the only kind of a newspaper that would do them any good, the utilities would have to pay for their advertising and that they could not buy news

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space. They knew also the value of newspaper advertising in putting across any legitimate proposition.

One of the first things these Committees and their Directors discovered was that aside from companies operating in the larger cities, but few were doing any newspaper advertising.

And they found out why.

There were two reasons:

First, the utility business has been and still is to a certain extent, a pioneering, engineering and highly technical industry. Its executives were builders, organizers, operators, trying to keep pace with an avalanche of demand for their service. They had had little experience in salesmanship.

Second, but little earnest, concerted effort had been made by the men who should have done this educational work, to sell the utilities on the merits of advertising.

Futile Advertising

Many of these companies had advertised occasionally on church and lodge social programs, in special editions or feature pages of the newspapers. The copy of their advertisements usually consisted of the name of the company and a list of officers. They didn't even say, "Cook With Gas," or "Buy an Electric Iron."

They expected no results and they got none. Naturally, such experience was not calculated to inspire them to look upon advertising as any more than a species of graft.

You will pardon me if I speak more particularly of our experience in Iowa, as naturally I am more conversant with the situation there. However, what I say of the work of the Iowa Committee applies equally to that of other state

Committees, as I know from constant correspondence and frequent conference with them.

Realizing this condition, the utility company executives who comprise the Iowa Committee, instructed me, at one of their first meetings, to devote as much time as was necessary to urge the utility companies of the state to establish definite, constant and consistent advertising policies and to try to make their advertising matter say something and buy them something.

In pursuance of these instructions our office started our work of education. Special bulletins were prepared and sent out to all companies in the state whether they were subscribing to the support of the Committee or not. It was fundamental, A. B. C. stuff, at first. We tried to correct the prevailing impression that advertising was a graft. We copied articles from advertising magazines and broadcasted them. We printed advertising suggestions in our bulletins. We wrote personal letters to them. Members of our Committee let no opportunity pass in conference to urge on others the value of this splendid means of increasing business and securing good will. The subject has been a part of the program of every convention of the public utilities of the state since the Committee was organized.

We told them they had no right to expect anything from their advertising but what that advertising brought them. In other words, they were not buying news space or the favorable consideration of the editor in his news columns. And a surprising thing about it was that in spite of the impression that advertising was a holdup, we found members of the industry as a whole easy to sell on the proposition when it was presented to them in the right light.

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And the members of the Iowa Committee are gratified with the results they have obtained. We did not depend for our knowledge on reports from the companies. We subscribed for every newspaper in Iowa, daily and weekly. We had girls in our office check them up carefully every day. All news matter and all advertising pertaining to our utilities was clipped and placed on my desk each day.

A Tremendous Gain

Our checkup for the end of the first six months of this year showed that these utilities which we represent had done twice as much newspaper advertising during those six months as they did all of last year. In other words, we had quadrupled our newspaper advertising in 18 months. We expect that the checkup at the end of this year will show twice as much newspaper space bought during the last six months as the first.

And we have only started.

Moreover, we have made satisfied customers. One member of my Committee who is the head of an operating company serving half a hundred small towns, signed a yearly contract with every newspaper in every town which he serves. He tells me that he is getting concrete results in the sale of service and appliances and can notice that his public relations are constantly improving. Demagogues are more hesitant in making attacks on his company as a means of getting into power.

Every company that has started advertising since we started to work on them is now a permanent customer of the newspapers. They are getting results. Moreover, they are disciples and champions of our cause, with all of the zealousness of new converts. They tell

us their advertising appropriations are the best investment they ever made.

Pays to Advertise

Here is an instance of one company serving about 40 Iowa towns, mostly weekly newspaper towns. Our checkup did not show a single advertisement in any of the newspapers from his company. He started about the first of last August. Here is the advertising he has done in two months' time. And he is delighted with the results. He sold more washing machines than he had during the two years previous. He figured out if he could sell washing machines by newspaper advertising, he could cultivate good will. He now has a regular series of ads running in each of his newspapers, telling his customers and the public in general something about his business.

Most of the larger companies have established advertising departments of their own. Some of the little fellows cannot afford this expense. Our Committee is helping them constantly to prepare their ads and asking the newspaper men in their communities to help them.

When matters of general importance to the industry of the state arise, we prepare advertisements and send them to the local companies, asking them to run them in their local newspapers.

And they do. Here is a series of ads entitled, "Your Servants, the Utilities," which we prepared, telling something of the fundamentals of the utility business. These ads appeared in hundreds of issues of Iowa newspapers and they are still running in many of them. Some companies used them as a basis for a series of their own. As an indication of the truth of the argument for continuous advertising, you may be interested to know that we received several requests

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for copies of the first few numbers of the series from people who had read later ones and were sufficiently interested to want them all.

One utility man came to my office a year ago and said he was expecting to ask for a renewal of his franchise in about a year. He wanted to start telling the public about it right away. We advised with him on the preparation of a series of advertisements which appeared in his newspapers every week during the whole year. It was a weekly town. He won his election by 433 to 27 votes.

Another company was not so wise, at first. It failed three times to get a renewal of its franchise. We talked advertising to the manager. He bought space, told his story for several months, then asked for a franchise and it was voted to him.

Advertisements prepared by our Committee and published throughout the state have explained the danger to amateur radio enthusiasts of getting too near transmission lines with their aerials. In the same way we have explained why light bills are higher in December than in June, how the cost of electrical service has been kept down while other services and commodities have risen.

In sending out these advertisements we ask the companies not to make the expenditures for them come from their regular appropriation, but to make them extra or supplemental costs.

Nation-Wide Results

What we have done for advertising in Iowa, similar Committees have done in other states. I have here letters and reports on the subject from the Directors of nearly all of the other Committees in the country.

In Illinois they estimate that they have

increased newspaper advertising 2,000 per cent in less than five years.

In Ohio the Director tells me that when his Committee was organized three years ago, utility companies were spending \$100,000 for newspaper advertising and are now spending \$500,000 and the amount is constantly increasing.

The Director of the Nebraska bureau says that Secretary O. O. Buck of the Nebraska Press Association has publicly stated that the activities of the Nebraska Committee have increased newspaper advertising 1,000 per cent.

I know personally of the good work that the Michigan, Wisconsin, Indiana and Missouri Committees are doing. The Rocky Mountain States Committee, serving Wyoming, Colorado and New Mexico, has boosted good-will advertising alone from nothing to 100,000 inches a year. This Committee, the same as many others are doing, gets out three or four ads a week, which are sent to member companies and used by them.

The Louisiana Committee, just organized, started its work by preparing a series of 12 ads explaining problems of the industry. The Director tells me they are being used 100 per cent by his companies.

You may have noticed in Mr. Tuford's Bulletin a communication from Mr. W. P. Strandborg regarding the organization of the Public Utilities Advertising Association. This association was organized largely through the efforts of Directors of Committees on Public Utility Information. Mr. Strandborg, the president, is the director of the Oregon Committee. Mr. Mullaney, director of the Illinois Committee, is treasurer. Mr. Lytle, associate director of the Illinois Committee, is a director.

Ad Club Branch

The association is a department of the Associated Advertising Clubs of the World and practically all of the Directors in the country attended its sessions held in connection with the Ad Club Convention at Atlantic City last June.

What appeals to me as the best argument why an industry should advertise was contained in Mr. Strandborg's 27 reasons "Why the Public Utilities Should Advertise." This article was sent to every public utility company in the United States. *Printer's Ink* thought so well of it that they had it reprinted and sent copies to 1,000 newspapers in the country.

This association is an honest-to-goodness organization of real live advertising men, who are intent on remedying a glaring fault in our economic structure. They intend to put the utilities where they belong as regards paid publicity and to forcibly eliminate by legitimate advertising, the muck-raker from the position of constant menace which he has occupied and clear the way for the development of an industry which is even now, in spite of handicaps, the marvel in business history.

Legitimate Publicity

I do not wish to appear to be trying to convey the impression that these Committees on Public Utility Information are advertising bureaus only. They are not. They are frankly publicity bureaus. They are employing every means available to inform the public what the utilities are doing.

The Directors know that advertising must be bought and paid for.

They know also that news space cannot be bought in any reputable newspaper.

They know that there are scores of

happenings regarding the industry which are legitimate news items and will be accepted by the newspapers as such. The best proof is that the newspapers are publishing news matter which is sent out.

Happenings of the Electric Light, Gas, Electric Railway and Telephone Industries are of interest because aside from the railroads they are the most important and indispensable industries.

There are 17 billions of dollars invested in these industries in the United States, more than four times what is invested in the steel business, 17 times as much as is invested in the wood-pulp industry, 12 times as much as is invested in the printing and publishing business.

And the ownership of these utilities is more widely distributed than that of any other industry. Two million people are actual stockholders in the electric light business alone. The insurance companies have 2 billions of dollars of the money of policy holders invested in utility securities. The savings banks have nearly as much.

So we claim there is legitimate news.

Moreover, the progress of a public utility is a story of the progress of your community. Every extension of wires, mains and tracks marks the growth of the city in population and wealth. They are vital to the comfort, welfare and security of your community.

Again let me talk more particularly of our work in Iowa, which is similar to that of other state Committees.

For instance, when there is a convention of any of the Utilities in Iowa, our office gets advance copies of the papers to be read. Many of them are highly technical and uninteresting to the layman. We pick out the news features. We think we know what the newspapers

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want. We prepare stories on the day's sessions and send them to the newspapers in advance to be held for release. They can be set the night before and are all ready in the morning when the foreman is clamoring for copy to fill up early forms.

Aid to Reporters

We keep track of the news of the sessions as they occur and hand the stuff to the reporters. I can present the testimony of a dozen Iowa city editors and reporters who were mighty glad to get this co-operation. They have told me that they wished that the insurance men, the lodges, the churches and other organizations had publicity departments like ours to help them get the dope.

When a company completes a new hydro-electric plant costing hundreds of thousands of dollars and harnessing forever a river, there is news in the story of its building and in pictures of the improvement.

Many Iowa papers commented on the record of one Iowa gas company, which operated for 66 years without a single moment's cessation of service.

Is there news in the fact that a power company is going to spend \$100,000 to connect up two important links in its transmission lines and improve the service of scores of towns?

During the coal strike we were called on constantly for information to show how much longer the utilities could continue to give service without new supplies of fuel.

Letters come to our office every day asking for special information regarding the industry.

There are more thrilling and entrancing stories available in the electric light and power, gas and telephone business,

than you can find in the annals of romantic literature.

And the newspaper editors know where the matter comes from that is sent out from our office. We do not try to slip anything over. If you think it is news, you can publish it if you want to. But we think that we know news well enough to know that you can't keep your hands off some of the stuff we send you.

These Committees publish news bulletins weekly or bi-weekly. Their circulation is not confined to the newspapers. They are sent to member companies, to libraries, to Chambers of Commerce, to schools which have asked for them, and to anyone who expresses a desire to have them. Our circulation list is growing constantly.

Many of the newspapers copy articles which attract their attention in these bulletins.

We believe that this is a legitimate effort towards publicity.

Anyway, it is an answer, and our increased advertising appropriations are an answer to the complaint that the public utilities were making no effort to tell the public anything about their business. We are answering this complaint by making an effort to tell the public everything we can about the business on every occasion that presents itself.

Educational Work

These Committees have many other activities.

We are getting out educational matter for use in the schools. I would like to call your attention to our latest piece of educational literature, a bulletin in simple language on the electrical business. Take home a copy and give it to your youngsters. You will not find anything in it

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that will bias their minds unduly, but you will find a lot of good information in language that they can understand.

Last winter we secured and distributed thousands of copies of a chart issued by the Smithsonian Institution, telling about the manufacture of gas.

In our work with the schools, we send nothing to them without first submitting copies to the school authorities and asking them to consider it carefully. We have secured the assistance of college and university professors of the state in preparing many of the special articles which have been published by the Committee.

While these Committees were not organized to combat municipal ownership, we are asked constantly for data on the subject and have been able to furnish it.

We believe and note that most of the newspapers of Iowa believe that public utilities privately owned but publicly regulated is the best means of affording utility service. Anyway, it is the prevailing means. Municipal ownership of public utilities is not as important as commonly believed. One company, the Commonwealth Edison, here in Chicago, generates more electrical energy than all of the municipal electric lighting plants in the United States.

And we believe that the trend is away from municipal ownership. We have a record of 60 Iowa towns, which have abandoned their municipal electric generating stations, either selling out altogether to private companies or buying their energy wholesale from the high lines.

Small Plant Doomed

With the vast system of interconnected stations rapidly joining powerful and distant points of generation, the small

plant cannot serve its community economically.

And considering the matter from a selfish standpoint, did you ever hear of a municipal electric lighting plant advertising? There may be some elsewhere in the United States, but not in Iowa. What advertising they get is in the news column. They take care of the business that comes to them. They are not aggressive. They are not even potential customers. And they are not in close touch with the industry as a whole, taking advantage by constant personal contact of the experience of others.

And who does most of the work towards promoting a municipal utility proposition when the matter is broached? The newspaper. It prints columns of free publicity on the subject, communications from the promoters, letters from officials in towns which are being deluded by faulty bookkeeping systems into believing that they are making money from their municipal plant, when as a matter of fact funds from general taxes are really supporting the proposition.

And what does the newspaper get? Probably, a few people get together a little fund to advertise a mass meeting or run an occasional ad. If the proposition carries, do you get any more money for advertising from the municipal plant? Not in Iowa.

I realize that I have rambled around considerably trying to tell you what Committees on Public Utility Information have done to promote advertising. Whatever they have done does not compare with what they expect to do. It has been figured that the public utilities were spending a year ago about one-fourth of one per cent of their gross income for advertising. I believe that figure is a little higher now. I know

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it is increasing. The Public Utilities Advertising Association has a goal for the next year of one per cent.

Whether it should go as high as the merchants' budget is a question for debate. Some companies are now expending three and four per cent.

Whether it will go as high, depends much on the activities and co-operation of the newspapers.

What we want of you advertising men is to show more interest in the kind of copy your utility company managers use. They will welcome your suggestions. We would like to have you sit down across the desk with them and give them the same snappy convincing advertising talk that you give the merchant down the street or the foreign advertiser. Try to sell them on advertising on its merits, not on the fact that you are a power in the community. They may fall for the

latter argument, but they will never be satisfied, enthusiastic customers.

A Fertile Field

We want you to realize the wonderful possibilities to you and the wonderful opportunity to the utility that lie in securities advertising, a field that has scarcely been touched. Why the public should buy public utility securities and become customer-owners is a story that should be told in advertising and told constantly and repeatedly to pave the way for the salesmen who put the matter up to the customer.

The Committees on Public Utility Information have paved the way for you. You will find that the utility man now knows something about newspaper advertising. He can't get away from it.

We want you to get out and sell more utilities on advertising and not wait for them to come to you with it.



A part of the front porch exhibit at the recent Convention

MAKING GAS
with a
"COOK BOOK"



*Good Gas Service
Convenient
Clean
Cheap*

THE good Wives and Mothers of Michigan have always shown the way to the nation for achieving wonderful pies and good things to eat.

Do you know that your Consumers Power Company also prides itself on its achievements in "cooking" or distilling coal—making Gas? Experts from many far cities have come to Michigan to study the methods by which Consumers Power Company renders "Good Gas Service" to you. For although our city is not the largest in the country, our organization constantly strives to make your Gas Service second to none.

Like all good cooking—gas is made from a "recipe." First of all—good coal. All coal is analyzed and tested, for certain standards must be met. This coal is "cooked" in air-tight retorts, and a gas vapor results. Gas in this first stage is not suitable for home use—it is scrubbed, and ammonia, sulphur, hydrogen sulphide and other impurities removed—so that when it is used, you have a clean, quick, hot flame. It is then pumped into the holders—and thence to your burners—waiting your wish, always ready, always willing.

Better methods—that's the answer. Consumers Power Company is constantly developing better methods to serve you—with the result that for all the help and convenience rendered, Good Gas Service is one of the cheapest home comforts to be had today.

**CONSUMERS POWER
COMPANY.**

An
example of
some of
the "Good
Will" Ads
used by
one of
our
companies

Proposed Activities of the Section for 1924

THE MANAGING COMMITTEE desires to continue the past year's work of the Publicity and Advertising Section in so far as it does not intrude upon what the Committee considers to be the most pressing demands of the moment as follows:

News and educational matter on the industry to be issued to the State Committees on Public Utility Information must be increased one hundred per cent. Twenty-five Committees are now operating in 34 states of the Union. Committee directors ask that they be informed fully on the following subjects as they relate to the gas industry—rate structure, house-heating, refrigeration, heating value standards and taxation. As evidence of this need, the following resolution which was passed by the state directors at Atlantic City can be cited:

Resolution Adopted by Special Committee Representing State Committees, Atlantic City, N. J., October 18, 1923
It is agreed among the directors of the

State Information Bureaus that they have difficulty in obtaining accurate statistics and material for stories in regard to the gas industry. It is therefore suggested that the American Gas Association, as a national body, in order to avail itself of the full value of the work of these State Committees, officially take this subject under consideration. It is the hope of the directors of these State Information Bureaus that more information in regard to the gas industry may be made available, for the general good of the industry.

For the Committee.

(Signed) JOSEPH B. GROCE.

In order to keep headquarters in close touch with the needs of these directors, a new Committee, "Committee on Contact with Information Bureaus," will be appointed.

In addition to the above it is essential that more statistical and financial information be gathered and issued to financial houses, magazines and trade papers. This is of great importance and is work which will be pursued actively during the coming year.



Anyone knowing of the present whereabouts of Isaac McGraw, at one time connected with the New Business Department of the Roanoke Gas Light Co., Roanoke, Va., and later with the Sumter Gas & Power Co., Sumter, S. C., is requested to communicate with J. E. McGraw, Granite City, Ill.

Over the Top

THIS means the three little Good Will Booklets shown here. It is also a warning to our members that if they want to "get in" on these good things, whose combined circulation is now near the 800,000 mark, they had better send in their orders to headquarters **AT ONCE**.

This is what is inside of these attractive little books:—



Sixteen pages full of practical, money-saving information for the users of gas. Fully illustrated and with a distinctive red cover that attracts at the first glance. The price—\$20.00 per thousand copies, including your company's name on the front cover. Special price of \$17.50 per thousand on orders of 10,000 or more.

The latest booklet of them all and the very first of its kind. Sixteen pages of fully illustrated text which tells the story of just what a B.t.u. is and what it does and still tells it in story-book fashion that even the kiddies will read with delight. Nothing technical—nothing hard—yet your customers, after reading it, can no longer have any mistaken ideas about the B.t.u. in the gas. Price—\$22.00 per thousand copies, including your company's name on the back cover. Special price of \$20.00 per thousand on orders of 10,000 or more.



TRUTHS ABOUT THE METER—



This little eight-page booklet tells all about the accuracy of the gas meter in picture and text as well as giving complete instructions on meter reading. It is invaluable as an open sesame to the gas meter which so often is a dark mystery to the consumer. Price—\$20.00 per thousand copies, including your company's name on the front cover. Special price of \$17.50 per thousand on orders of 10,000 or more.

These little books make friends. They are going rapidly. Orders should be placed at once with headquarters.

MANUFACTURERS SECTION

G. W. PARKER, Chairman

E. E. BASQUIN, Vice-Chairman

C. W. BERGHORN, Jr., Secretary

Container Investigations at the Forest Products Laboratory*

C. A. PLASKETT, Forest Products Laboratory, Madison, Wis.

EVERY MANUFACTURER and shipper realizes that much grief and a large economic waste would be eliminated if his goods were delivered to his customers in the same condition that they left the factory. How this can be accomplished without excessive packing costs is the problem which confronts practically every manufacturer throughout the country.

His product may be ideal and the time ripe to enjoy increased sales at fair prices, but because his goods arrive at destination in bad order it is difficult at times to retain even his old customers. Delivery of goods in proper condition will do much to create and stimulate consumer demand, while goods delivered in bad order has the reverse effect.

The railroads complain of the large loss and damage claims which they have been compelled to pay during the past few years. In 1921 their loss and damage claims on freight amounted to \$96,730,376. These claims were so startling that the railroads decided to investigate the causes. They found that there were many causes contributing to these losses, a considerable portion of which was attributable to rough handling of freight at transfer points. They discovered that rough handling of cars, particularly in yards, was deserving of

special attention, not only by reason of the excessive claim expenditures with that assigned cause, but also because of the damage to the equipment. As a result, they have been carrying on a vigorous campaign to educate their employees in the proper handling of cars and freight. This campaign, which has necessarily cost the railroads considerable effort and money, has produced remarkable results.

The loss and damage claims for 1922 were reduced to about half what they were a year previous when this campaign was started. On stoves, furnaces, radiators, etc., the claims were reduced from \$902,904 in 1921 to \$555,263 in 1922, a reduction of 38.5 per cent. This is proof positive that the railroads are expending considerable effort to overcome the obstacles of delivering goods in a satisfactory manner. But the railroads cannot do all. Even with the most careful handling consistent with efficient transportation, the goods must be packed to withstand reasonable hazards. Every manufacturer realizes that for the shipment of goods poorly packed which involve a big risk of loss or damage, the railroads must be protected with high freight rates. Freight claims, therefore, are an economic waste that we all want to eliminate.

*An address delivered before the Fifth Annual Convention of the American Gas Association, Atlantic City, Oct. 15-19, 1923.

It is the duty of every manufacturer to pack his goods so that they will arrive in a satisfactory manner, but he should not be called upon to spend more money on packing than is necessary for safe delivery.

In their campaign, the railroads have endeavored to acquaint the shippers with the better methods of packing, but few shippers seem to realize the big possibilities of proper packing aside from reduced freight claims and safe delivery. Proper packing is a growing advertising medium which will yield results in proportion as it is scientifically worked. Contrary to the general belief that **better packing means an increase in distribution costs**, many manufacturers have discovered that it is possible to improve their methods of packing and at the same time affect a substantial saving in the costs. This has been accomplished by their best men giving special attention to the problems involved in packing their particular products.

In the past ten years, manufacturers and shippers have been gradually awakened to the advantages of proper packing, and a great deal of information is now available on this subject. The agitation of scientific packing has been centered very largely around the work of the Forest Products Laboratory. This work was started about thirteen years ago when its importance was not generally recognized. In order that you may better appreciate the value of the information accumulated on scientific packing, I will give a brief sketch of the whole work of the Forest Products Laboratory.

The primary purpose of this government research institution, which is maintained by the Forest Service of the United States Department of Agricul-

ture at Madison, Wis., is the conservation of American forests by developing the most complete utilization of the trees, the best possible utilization of the products and the most economical methods of converting the trees into finished products. It is because of the big possibilities of conserving the forests by developing better shipping containers with less lumber, that the laboratory has devoted so much attention to container design. (Statistics show that about 1/6 of the lumber cut each year is used for boxes and crates.)

The work of the laboratory, which consists chiefly of fundamental research, dealing with wood in most of its properties and uses, is divided among seven technical sections. Although the work in each of these sections deals with different studies of wood and its uses, the results obtained are in some ways fundamental to the study of shipping containers. For instance, information on the suitability and use of various woods for pulp, paper and special products, as obtained by the Section of Pulp and Paper, is of value in the study of solid fibre and corrugated fibre boxes. Information on the physical structure of wood furnished by the Section of Timber Physics is of value in the study of all wooden containers. The Section of Wood Preservation furnishes information on preservative treatment of wood, on glues and problems connected with their use, painting and varnishing, waterproofing, and the finishing of wood. Closely allied with this work is that of the Section of Pathology which deals with molds and wood-destroying fungi. The chemical properties and uses of wood are studied by the Section of Derived Products. Close touch is kept on the equipment and practice of all wood-producing and consum-

ing industries by the Section of Industrial Investigations.

Problems connected with shipping containers are studied in the Section of Timber Mechanics. This section is concerned chiefly with the study of the strength of wood, the design and strength of articles constructed of wood, and the factors which influence their strength. The large amount of data accumulated in this section on the strength properties of wood fits it especially to carry on investigations on the design of shipping containers and other built-up constructions.

These data have been obtained largely from tests on the physical and mechanical properties of more than 150 native species, including hundreds of tests on timbers of structural sizes. In studying wooden joints thousands of tests have been made on the holding power of nails, screws, bolts and other fastenings.

The study of shipping containers, however, has not been lacking from the practical or commercial viewpoint. In the commercial application of such data a detailed knowledge of the nature and causes of container failures is necessary. Therefore, at the beginning of this work, studies were made at various railroad centers and other shipping and receiving points. While these studies revealed the methods of handling and the nature of the failures, it was found that after goods have been shipped various distances and arrive in a damaged condition it is practically impossible to determine the exact causes of the failures or the best method of preventing such failures. To overcome this uncertainty and better to study the design of containers, the laboratory has endeavored to develop testing equipment and methods of testing which produce by known methods of

handling, loading, etc., the same kind of failures as are commonly observed in transportation.

This work has resulted in the development of a great deal of special equipment as well as standard methods of testing. The first tests which were made on packing boxes consisted in applying a load along the diagonal of the box, thus producing very slowly many stresses which occur when a box is dropped on one of its corners. The load was measured at predetermined increments of increased deflection, and notes were made of the initial and subsequent failures. Similar tests are made by applying the load on the edge, or face of the box. Tests are made also by dropping the package in different ways from various heights. Other tests are made with a vibrating machine which simulates the swaying or weaving of a moving freight car and the starting and stopping of a train. These tests show the relative strength of the containers when subjected to stresses which are distributed more or less through them, but they do not show the ability of a container to resist local fracture caused by one box falling cornerwise on top of another.

In an effort to devise a single method of testing which would subject the package to a greater variety of transportation hazards, the revolving hexagonal drum testing machine was developed. In this drum are arranged a series of hazards which, as the drum revolves, cause the package to roll and tumble in ways that result in stresses, shocks, and rough handling similar to those of actual transportation. On one face of the drum is a projection upon which the package falls, thus simulating a box dropping cornerwise upon another. For this test the container is loaded with its contents

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or a substitute which produces the same effect. Various other methods of testing are also employed. With such tests as are made at the laboratory the package is watched, the development of the failures traced, and improvements made to prevent such failures. Besides being more certain laboratory tests are far cheaper than trial shipments.

Although the data accumulated in conjunction with the development of these machines was largely fundamental, the laboratory maintained that no research work should be considered complete until its commercial practicability was established. Therefore, special efforts were made to keep the public in touch with the work which was being done, but it was not until after the outbreak of the war that the importance of the work was generally realized. At this time the laboratory was called upon to assist the War Department in the preparation of general specifications for overseas containers and to test containers for the purpose of redesigning them along economical lines. To handle this work a unit of the Section of Timber Mechanics was devoted exclusively to the study of shipping containers and methods of packing.

During this time work consisted almost entirely of applying fundamental data in the development of containers for export shipment. At the close of the war efforts were made to revert to the study of fundamentals of container design. By this time, however, the value of the work done for the War Department had become so generally known that many requests were received to assist shippers and manufacturers with their particular packing problems. These requests are so numerous that the laboratory is able to handle but a limited number of them

in conjunction with the fundamental studies. The laboratory is not provided with funds to cover the cost of specialized commercial problems. This work is done on a co-operative basis whereby the co-operator pays the actual cost of making the investigation. A large number of manufacturers have taken advantage of this service and a wide variety of containers and commodities have been sent to the laboratory to be studied.

In nearly every box or crate sent to the laboratory for testing, less lumber might have been used and the strength of the container increased by a redesign. The redesigned containers usually effect a considerable saving in weight and shipping space, with a resultant decrease in freight costs. The ultimate criterion as to the perfection of any container is the condition of the contents at destination and the cost involved in making and shipping the package. After the tests have been completed, containers must be watched in service in order to determine whether or not the laboratory tests have faithfully reproduced the conditions of transportation.

In our study on the crating of furniture and other products requiring similar protection it was found that weaving and skewing of the crates during transportation are responsible to a large extent for racking the joints and breaking the legs and other projecting parts. It was shown through tests that these injuries can be eliminated to a large extent by the proper use of diagonal braces, which are very effective in producing a rigid crate.

The original crates which were constructed with several parallel slats appeared to be very strong, partly because of the amount of lumber used. This construction, however, is very weak in

resistance to weaving and skewing. To produce rigidity some kind of bracing is necessary. It has been found that diagonal braces are the most efficient means of producing rigidity. In fact, unless proper diagonal bracing is used it is practically impossible to build a crate, without excessive lumber and labor, which will not weave or skew during transportation. Diagonal braces on four sides produce a crate which is rigid in two directions, but it is not so rigid in the third direction. Neither does solid sheathing on all faces make a crate so rigid as diagonal bracing, except perhaps sheathing which is made of wide boards with tighter joints than can usually be obtained. There is a possibility then of the boards shrinking and opening up in the joints. To produce a thoroughly rigid crate, diagonal braces should be used on each of the six faces.

The frame members, that is, the foundation or skeleton to which all other parts are fastened directly or indirectly, and the method of fastening these members together, are of utmost importance. Care should be exercised to have these members made of good sound material. The 3-way corner construction which is now being used quite extensively is a very satisfactory method of joining the corner members of a crate, but this construction alone does not produce a crate which will remain rigid during transportation. This construction reenforced with a single diagonal brace on each of the six sides, however, has been found to produce a crate with maximum rigidity for a minimum amount of lumber.

The method of constructing a crate best suited to a given product depends upon the nature of that product and the kind of protection needed. It is needless to use a heavy rigid crate on a prod-

uct which is itself strong enough to withstand the rough handling of transportation. Such a product would require merely a snugly fitting crate to protect it from blows and make it stack well. On the other hand, a product having but little strength requires a crate which has sufficient strength and rigidity to resist skewing and protect the contents against the hazards of transportation.

The problem of packing enameled gas ranges is quite similar to that of packing delicate pieces of furniture. The crate must be sufficiently rigid to offer proper protection to the stove. Weaving and skewing of the crate permits the shocks of transportation to be transmitted to the stove, causing the thin sheet of metal to bend and buckle and thus chip the enamel. The legs or other projecting parts may also be bent or broken.

The proper method of supporting the stove in the crate is a factor of no mean importance, but for which only very general rules can be given. Each of the many different classes of stoves offers a special problem which must be solved separately. In general, however, gas ranges should be supported in such manner that their weight is not carried by fragile or easily broken parts. Loose parts should be fastened securely in place or dismounted and packed separately within the crate.

In addition to such co-operative tests in which special packing problems are studied, the information accumulated by the laboratory is disseminated in other ways, such as correspondence, technical notes, articles in trade journals and personal conferences. A special effort is always made by the laboratory to acquaint the public with the results of

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its investigations and assist in the application of the data.

Liberal use of this service is made by the railroads in their campaigns for better packing and better methods of handling freight. The reduction in loss and damage claims during the past year is accredited very largely to a more general application of the data accumulated at the laboratory, especially that pertaining to the use of metal strapping.

The educational courses of instruction on container design given at the laboratory have proved to be another very successful means of disseminating information. These courses are designed to demonstrate by actual tests the fundamental principles underlying efficient container construction. Special courses are also arranged to meet the needs of any particular group of manufacturers having similar packing problems. Each course lasts one week and is open to anyone paying the fee to cover the cost. More than 200 representatives from firms located in all parts of the United States, the Hawaiian Islands and Canada have already taken advantage of this service.

Since it has been necessary for the laboratory to confine its co-operative work to a limited number of problems which have the broadest commercial application, a number of commercial lab-

oratories have been established and patterned after the Forest Products Laboratory. Among those laboratories the following may be mentioned: The Chicago Mill and Lumber Company, Chicago, Ill.; the General Electric Company, Schenectady, N. Y.; and the Container Testing Laboratories, Inc., Rockaway, N. J. There are other laboratories which are interested primarily in the study of solid fibre and corrugated fibre boxes. All of these laboratories are doing excellent work and it is the desire of the Forest Products Laboratory to co-operate with them, as well as the general public, to the fullest extent.

Although a vast amount of scientific data has already been accumulated by the Forest Products Laboratory and other organizations, there are many factors influencing the economic construction of containers which have not been fully studied. Many years of intensive work will be needed to complete the study. Individuals or companies by referring their wood problems to the laboratory may obtain a statement of the tests thought necessary, and the laboratory will co-operate in their solution to the fullest extent possible with the available funds and personnel.



The slogan in sand at Atlantic City

INDUSTRIAL GAS SECTION

H. H. CLARK, Chairman

H. O. LOEBELL, Vice-Chairman

C. W. BERGHORN, Jr., Secretary

House Heating*

E. D. MILENER, Consolidated Gas, Electric Light and Power Company, Baltimore, Md.

THE USE OF gas in central house-heating plants has opened up possibilities for the sale of gas that were formerly not dreamed of. From a small beginning ten years ago it has rapidly grown to such size that today it presents to our colleagues in the manufacturing and distribution departments one of their largest problems, but at the same time opens to us the greatest unsold field ever presented.

I do not suppose that there is any current subject being more broadly discussed by gas sales managers and engineers than that of house heating. Honest differences of opinion have arisen as to how far gas companies should encourage this class of business with their present rates, generating and distributing systems, and to what extent provision should be made in the future to sell gas for space heating. Since this discussion first began, several things have happened.

First, the public mind has ceased to class gas heating purely as an expensive luxury, but now regards it as something highly desirable and ultimately within reach. In this respect it occupies the same position that cooking with gas did twenty or twenty-five years ago.

Second, while the principles underlying the correct application of gas to central heating plants were known to comparatively few men five or six years ago, enough work has been done since

that time to cover every kind of application.

Third, standard equipment is now available which will take care of any type of heating job likely to be encountered. The number and character of inquiries received, both by Association Headquarters and at the several cities where considerable house-heating work has been done, convinces your committee that there is a constantly growing desire on the part of gas men for knowledge on this subject, which desire is receiving its impetus from the inquiries consumers are making of their local gas companies.

A "Handbook on Central Gas Heating Practice" can be of value only if it meets the needs of those who will use it. An open discussion by those most interested will bring out these needs. In gathering data which will form the basis of such a book, your committee has been faced with the fact that nothing approaching a standard practice exists. A survey of the country has shown that in hardly any two localities is there complete accord in methods of applying gas to central heating plants. This can be accounted for by the fact that the science being a new one, there is still much experimenting going on and various ideas are still being tried out, many cities today duplicating tests that were conducted in other localities several years ago. However, no one can say with certainty what

*Report of the Committee on the preparation of a booklet on "House Heating" read before the Fifth Annual Convention of the American Gas Association, Atlantic City, October 15-19, 1923.

will ultimately be considered the best practice when applied to all local conditions, and it is only through a wide dissemination of present-day knowledge that we can expect the science to advance.

Your committee believes that a "Handbook on Central Heating Practice" should be divided into three parts. First, a broad outline of the subject, showing general methods of calculating costs, load factors, comparisons with other fuels and an outline of troubles likely to be encountered with suggestions for preventing their occurrence. The second part should present in detail the complete local heating practice of each city that is pushing the sale of gas for heating purposes. Every practice adopted by the various companies has some reasons back of it and a thorough discussion and explanation of these reasons should prove of great value to everyone actively engaged in house-heating work. The third part should contain a description of all available house-heating equipment, written especially for the heating engineer and salesman, together with designs of connections, and methods of operation, repair and maintenance.

Forgetting for the moment the question as to whether or not it will help the load factor of the plant to encourage gas heating, if any such business is taken on, it will fall to the province of the members of this section to make the application. I do not believe it is possible for the gas company to greatly influence the type of building construction in vogue in any particular city. Likewise, I do not think that we can dictate the kind of heating plants that will find favor with property owners. This means that we must take conditions as we find them and make our installations accordingly. Thus, on the Pacific Coast, where hot

air heating has always been most popular, hot air furnaces are being energetically pushed, while in the East the greatest effort has been made to popularize steam and hot water boilers. Regardless of the section of the country in which one resides, his knowledge of the subject is incomplete unless he has a thorough understanding of all systems.

Viewing the question strictly from the utilization standpoint, there are several things that must be considered. Gas boilers and furnaces must be simplified. All accessories that are not easily understood by the average consumer must be eliminated. We have seen great changes in boiler and furnace design lately, but it behooves every one of us to cooperate with the manufacturers to the limit of our ability in helping them still further perfect their products. More money is being spent and more people are today working and spending time on automatic oil burners for space heating than ever worked on gas heating, and if we are to successfully meet this competition, it must be with appliances that are simpler and easier to operate than oil burners.

Safety must always be uppermost in the minds of those who design and install gas heating plants. There is potential danger in every plant that is not properly designed, installed and operated, and we must take the greatest care to see that every necessary safety precaution is taken whenever an installation is made.

The impression exists in some quarters that a gas boiler does not need as large a flue as a coal boiler of similar rating, but it has been the experience of some of us that chimneys equally as good as those used for coal boilers are necessary if the best results are to be secured. While no

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flue is better than a poor one, efforts should always be made to connect heating plants into chimneys of ample size, and with a positive draft.

A subject of paramount importance is the handling of condensation in flue connections and chimneys. Under certain conditions, condensation is bound to appear. If the chimney is not lined, the only way to prevent moisture from seeping through is to line the chimney with cement or terra cotta. If conditions are such that condensation in the breeching cannot be prevented, there is only one thing to do to make the flue connection permanent—that is, make the pipe of an acid-resisting material. I have heard of companies adopting various so-called rust-resisting materials, but in Baltimore, where we conducted tests extending over a period of more than five years, we were forced to use either terra cotta, sewer pipe or pipe made of solid sheet lead. Due to the great bulk of the former, and the difficulty encountered in erecting it, and installing the proper draft hood, we have now standardized on 1/16" sheet lead flue connections and are thus sure of permanent jobs.

The maintenance and servicing of house-heating installations present problems that are new with the growth of this branch of our business. Unlike most industrial appliances, these installations are not under the constant care of an operator more or less skilled in making repairs and adjustments, and whose continued employment depends upon the gas appliance being kept in operation. House-heating jobs are placed in an out-of-the-way section of the building and unless the owner takes a personal interest in his plant and has some mechanical ability, the furnace will receive very little attention indeed. The importance of this

is apparent when one realizes that the average plant consumes about 400 cubic feet of gas per hour, which is far greater than any amount of gas formerly liberated in the basement of residences. When it is realized that this amount of gas is controlled entirely by mechanical devices and that, unlike instantaneous water heaters, it burns for hours when once turned on, it can be seen that every detail of the equipment must be in perfect working order at all times.

Who is to assume the responsibility of seeing that this isolated equipment is kept in perfect working order?

There are certain details of the plant that the average customer cannot take care of, however willing he may be. For instance—valve trouble, flue trouble, burner trouble and thermostat trouble. Add to this the tendency of salesmen to promise automatic heat without any attention, and Mr. Customer generally declines to learn anything about the operation of his plant. Surely the gas company cannot forever assume the burden of the detection and remedy of every ill, petty or otherwise, that heating plants are subject to. This problem of maintenance is not so serious when a company first begins installing heating jobs, and all appliances are new, and either the superintendent or some cadet engineer are nursing them along. But when the business reaches the real commercial stage and the number of jobs on the lines reaches up in the hundreds or the thousands, and the boilers get old and dirty, that is the time when their proper maintenance becomes a real problem. Some companies only send out on these jobs when the customer requests it. But does the customer always know whether or not his plant is in need of attention? I do not believe he does. Yet he de-

mands instant service on the first cold day of the year at which time he sends a hurry call to the gas company to turn on his plant. In Baltimore only last week we received hurry calls from over one hundred customers in one day, to light pilots and turn on their plants, and as it was necessary for our own protection to assure ourselves that each job was mechanically right before we left it, it can be seen what a tax it is on the company to render the proper kind of service at the instant the customer wants it.

Every company that wants to and does undertake to sell central house heating is immediately confronted with the question of converting coal boilers to the use of gas. This is due to the cheapness of converting coal boilers and furnaces compared with installing gas-designed equipment. Most companies have discouraged such installations and it is generally recognized that only in extreme cases will the operating cost of a converted job be as low as that of a gas-designed job. Mechanically, the operation of converted equipment can be made quite as satisfactory as gas-designed equipment, when the former is properly designed and installed, but the fly in the ointment is the attempt of plumbers to secure some of this business with inferior burners installed in an improper manner. It is impossible to expect plumbers to install good converted jobs, and unless a converted job is installed with the greatest care by recognized experienced men, dissatisfaction with the gas company will surely result.

However, it is possible to standardize on converted jobs to a certain extent. In Baltimore we have worked up a standard method of converting boilers and furnaces, which has been closely followed in Denver during the experiments that were run there last season. While the Baltimore company does not at present encourage the installation of burners in coal furnaces, I personally installed over 150 converted jobs five or six years ago, most of which are still in use. And a remarkable thing that I particularly wish to call to your attention is that not only has the operating cost of these jobs been entirely satisfactory, but the number of complaints per job per season consistently runs less than for gas-designed steam, hot water or hot air installations.

Undoubtedly a demand for gas heating exists today and will continue to exist in the future. Due to the difference in cost between coal heating and gas heating, we must use judgment in applying the latter. This applies both to the conditions of use and the financial standing of the prospect. We must bear in mind that the tendency is for all classes of people to install gas to a greater extent each year, but that most companies are not yet in a position to take on the load. Under the circumstances it is the duty of gas-heating engineers to properly direct its application in the interest of both the customer and the company, as the business can only endure when the needs of both are served.

Survey of Current Business

This is the title of a monthly publication of the U. S. Department of Commerce which gives practical information on current business investments, both in the form of text and diagrams and tables. The subscription price is \$1.00 per year.

COMMERCIAL SECTION

J. E. DAVIES, Chairman

J. P. HANLAN, Vice-Chairman

LOUIS STOTZ, Secretary

Proposed Activities of the Section for 1924

THE COMMERCIAL SECTION has in contemplation a program which should be productive of practical benefit to all members of the Association as will be seen from the outline of the various committee activities given below.

Sales Stimulation

The preparation and distribution to member companies of a series of illustrated gas sales promotion bulletins will be continued.

Under the auspices of this committee another gas appliance sales per meter contest will be conducted and this year the additional data of gas sales per meter will be collected. The data collected last year proved of such value and interest to our members that every member company is urged to co-operate to the fullest extent during the coming twelve months.

In addition to these continued activities, the committee will undertake the preparation of a salesman's manual written in popular, non-technical style and so complete that it will answer every question which the sales representative would meet in his contact with the prospective customer in his efforts to sell appliances.

Further, the committee will undertake the revision of the "Gas Equipment of the Home," a booklet originally prepared by the old National Commercial Gas Association for distribution to architects, builders, contractors, etc. This will be brought up-to-date, strengthened in its appeal and an effort made to make it a

standard book of information. In connection with this, another booklet, "Gas in the Home," may be prepared for general distribution by gas companies to their consumers.

As a further stimulus to encourage the most efficient use and the greater use of gas and to further popularize the idea of gas service, an attempt will be made to tie-in more closely with what has now become a national movement, viz., Home Beautiful Week. Briefly, this plan is for the erection and complete equipment of a model home in as many cities of the country as possible and our member companies will be urged to cooperate in their localities to insure that these demonstration homes are adequately piped and fully equipped with gas appliances and gas service.

An effort will be made also to improve the quality of window displays by the member gas companies and to bring about a greater interest on the part of sales managers and those directly interested in merchandising. A plan is being worked out for an A. G. A. window display club, membership in which is open to any member of the Association without cost. The hope is that such a movement will stimulate interest on the part of many individuals who have talent and valuable display ideas which they will contribute through the Association for the general good of the industry.

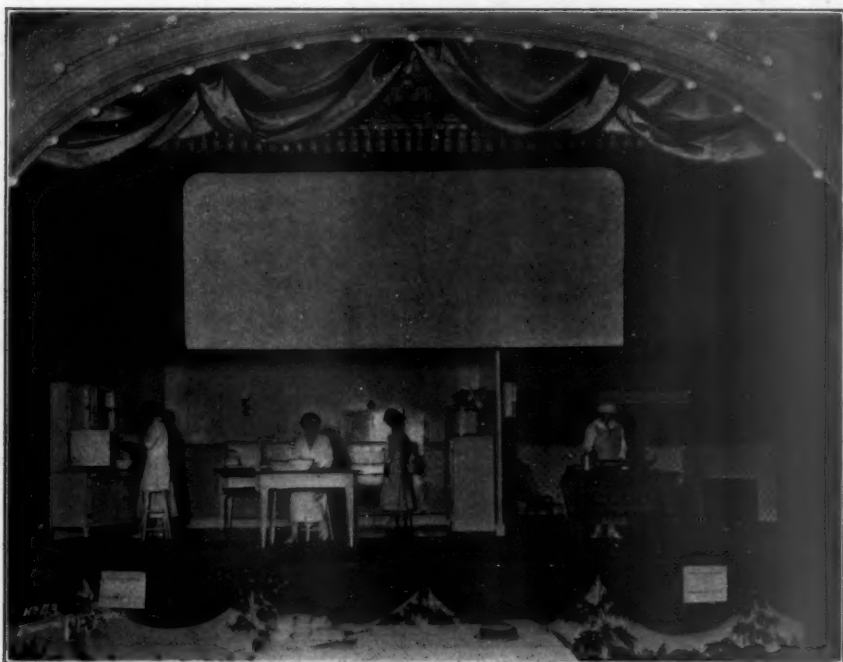
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Committee on Home Economic Service Bureaus

During 1923 this committee prepared a comprehensive report on this important phase of gas company activities, which report was distributed to the member companies and which resulted in considerable interest, many companies intimating an intention to seriously consider the organization of such a department of their company's activities. The efforts of this committee will be continued in an effort to interest member companies in organizing Home Economic Service Departments and its scope of activities will be broadened in an effort to establish a closer contact with domestic science

school teachers and schools by the preparation and dissemination of useful and interesting information through the public press which would include syndicated illustrated stories concerning the use of gas in the home. The committee will also make recommendations to the member companies and will assist them in the effective carrying on of home economic service departmental work.

Summing up, the Commercial Section activities for the year 1924 will be predicated largely on the platform of increased profitable gas sales and the energies of the Section will be directed to that end.



**How the stage looked during the cooking demonstrations at
Atlantic City**

The A. G. A. Window Display Club

IN ADDITION to those whose duty it is to create and install the window displays for their particular company, there are many individual members of the A. G. A. who would undoubtedly welcome an opportunity to exercise their talent in a direction where their ideas could be utilized to advantage by the industry.

With that thought in mind the Managing Committee of the Commercial Section has arranged for the organization of a WINDOW DISPLAY CLUB. Every member of the Association is eligible to join and there is no charge to the individual,—all that is required is that he or she sign a pledge card to join the movement for "Better Gas Merchandise Displays."

A *Committee on Awards* consisting of the Vice-Chairman, Secretary of the Commercial Section and Mr. L. E. Lindsay, Manager of the Display Section of The Peoples Gas Light and Coke Company of Chicago, will pass upon the merits of the suggestions offered which will be judged according to the following point system:

<i>Basis for Award of Prizes</i>	<i>No. of points</i>
1. Originality of idea	4
2. Value from gas sales standpoint	3
3. Value from appliance sales standpoint	2
4. General effectiveness	1
Total	10

The Association reserves the right to confine prize awards to those contributions which qualify with seven points.

A monthly cash prize of \$10.00 will be awarded to the member of the club

who submits the most original and practical suggestion for a display.

A special prize of \$15.00 will be awarded for the best suggestion submitted during the first and second six months of the Association fiscal year.

A grand prize of \$25.00 will be awarded for the best display submitted during the entire year.

No member of the club may submit more than three (3) suggestions each month.

The Association reserves the rights to all contributions submitted by members of the club and may distribute the ideas and suggestions of all contestants to the entire Association membership for the good of the industry.

Contributions may consist of photographs, sketches or written descriptions of either actual or suggested displays, preferably however with full detailed floor plans, instructions for installation, description of draperies, properties, window cards, etc., and approximate cost of the display.

ENROLLMENT CARD

I hereby enroll in the Window Display Club of the American Gas Association and pledge my support to the movement for "Better Gas Merchandise Displays" and agree to abide by the rules that all contributions shall become the property of the Association to be used by it for the general good of the membership and the industry.

Signed
 Company
 Address



Associations Affiliated with A. G. A.

Canadian Gas Association

Date of Affiliation—Mar. 25, 1919.
Pres.—C. A. Jefferis, 265 Front St., E., Toronto, Ont., Canada.
Sec.-Tr.—G. W. Allen, Consumers' Gas Co., Toronto.
Conv., 1924.

Empire State Gas and Electric Association

Date of Affiliation—Nov. 21, 1919.
Pres.—M. J. Brayton, Utica Gas & Electric Co., Utica, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
Annual Meeting, 1924.

Illinois Gas Association

Date of Affiliation—Mar. 19, 1919.
Pres.—Robert B. MacDonald, Peoples Power Co., Moline, Ill.
Sec.-Tr.—R. V. Fraether, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., 1924.

Indiana Gas Association

Date of Affiliation—April 24, 1919.
Pres.—L. Fitzgerald, Gary Heat, Light & Water Co., Gary, Ind.
Sec.-Tr.—E. J. Burke, Citizens Gas Co., Indianapolis, Ind.
Conv., 1924.

Iowa District Gas Association

Date of Affiliation—May 21, 1919.
Pres.—Charles Smith, Yankton Light & Heating Co., Yankton, S. D.
Sec.-Tr.—H. R. Sterrett, 531 Seventh St., Des Moines, Ia.
Conv., 1924.

Michigan Gas Association

Date of Affiliation—Sept. 18, 1919.
Pres.—Geo. H. Waring, American Public Utilities Co., Grand Rapids, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., 1924.

Missouri Association of Public Utilities

Date of Affiliation—June 18, 1920.
Pres.—H. C. Blackwell, 1330 Grand Ave., Kansas City, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Wiley F. Corl, Chmn., Affiliation Com., Missouri Utilities Co., Mexico, Mo.
Conv., 1924.

New England Association of Gas Engineers

Date of Affiliation—Feb. 19, 1919.
Pres.—C. E. Paige, C. H. Tenney & Co., Boston, Mass.
Sec.-Tr.—J. L. Tudbury, 247 Essex St., Salem, Mass.
Conv., Copley-Plaza Hotel, Boston, 1924.

Gas Sales Association of New England

Date of Affiliation—Oct. 1, 1919.
Gov.—F. A. Woodhead, 689 Massachusetts Ave., Arlington, Mass.
Sec.—J. H. Sumner, 719 Massachusetts Ave., Cambridge, Mass.
Annual Meeting, 1924.

New Jersey Gas Association

Date of Affiliation—April 25, 1919.
Pres.—James P. Hanlan, Public Service Gas Co., Newark, N. J.
Sec.-Tr.—R. A. Koehler, Public Service Gas Co., Newark, N. J.
Conv., 1924.

Pacific Coast Gas Association

Date of Affiliation—Sept. 18, 1919.
Pres.—H. R. Basford, H. R. Basford Co., San Francisco, Cal.
Sec.-Tr.—W. M. Henderson, 812 Howard St., San Francisco, Cal.
Conv., 1924.

Pennsylvania Gas Association

Date of Affiliation—April 10, 1919.
Pres.—Grier Hersh, York Gas Co., York, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., 1924.

Southern Gas Association

Date of Affiliation—May 20, 1919.
Pres.—E. L. Rieha, 1602 Lexington Bldg., Baltimore, Md.
Sec.-Tr.—E. D. Brewer, 75 North Mayson Ave., Atlanta, Ga.
Conv., 1924.

Southwestern Public Service Association

Date of Affiliation—September 26, 1923.
Pres.—J. H. Gill, Dallas, Texas.
Sec.—E. N. Willis, 403 Slaughter Bldg., Dallas, Texas.

Wisconsin Utilities Association

Date of Affiliation—March 25, 1919.
Pres.—Harold L. Geisse, Wisconsin Valley Electric Co., Wausau, Wis.
Exec.-Sec.—J. N. Cadby, 445 Washington Bldg., Madison, Wis.

Geographic Divisions

Eastern States Gas Conference

Date of Formation—April 11, 1923.
Pres.—F. H. Gadsden, The United Gas Improvement Co., Philadelphia, Pa.

Sec.-Tr.—L. R. Dutton, Philadelphia Suburban Co., Jenkintown, Pa.

Conv., 1924.

TECHNICAL SECTION

L. J. WILLIEN, Chairman

GEO. H. WARING, Vice-Chairman

H. W. HARTMAN, Secretary

Proposed Activities of the Section for 1924

THE TECHNICAL SECTION will continue many of its committee activities engaged in during 1923 such as:

Carbonization Committee

From the data already collected on Coal Gas Equipment, Operating Results and methods of Recording Carbonizing Data in use by company members, the committee expects to keep in close touch with the smaller companies with the purpose of improvement in operation. They will also continue their work on the Complete Gasification of Coal and Low Temperature Carbonization.

Chemical Committee

This committee will continue the revision of laboratory methods and the investigation of methods of purification, including liquid purification, removal of organic sulphur compounds, etc.

Coke Committee

The important educational work on the intrinsic value of coke as a domestic fuel will be continued as well as that on the importance of sizing, handling, etc., of the coke for the domestic market.

Deposits in Gas Pipes and Meters

This important investigation will be continued throughout the year.

Distribution Design

It is the purpose of this committee to continue the compilation of data of the

greatest practical application in the design of Distribution Systems.

Measurement of Large Volumes of Gas

This committee has in progress the work of establishing with the Bureau of Standards a basis for co-operative investigation and tests on the relative accuracy of all types of meters manufactured for the measurement of gas in large volumes. This work will be continued.

Standardization of Capacities of Consumers Meters

This valuable work, which has progressed to date to the adoption of the first minimum schedule of 10 case sizes and capacities for single and double diaphragm tin case consumers meters, will be actively pursued during the coming year.

In addition to the work of these committees the following activities are contemplated:

1. A study of Distribution Problems.
2. Establishing a Co-ordinating Committee on Research Problems which will act in an advisory capacity as to relative importance of new research work proposed.
3. A continuation of the study of the Fundamentals of Condensing and Scrubbing.
4. A Revision of the Catechism of Central Station Gas Engineering Practice.

Factors in the Design of Absorption Apparatus

W. K. LEWIS and W. H. McADAMS, Department of Chemical Engineering, Massachusetts Institute of Technology.

IN THE GAS industry there exist two types of problems each involving interaction of a gaseous mixture with a liquid, i. e., the absorption of some component from a gas by a liquid and the removal (stripping) from a liquid of some component by a gas or vapor. In all apparatus for this purpose the most important factors in design and operation are capacity and efficiency. The quantitative relation between these two factors is determined by the mechanism of the interaction. During recent years great progress* has been made in studying this mechanism and the purpose of this article is to present an analysis of these phenomena in the light of this progress. For simplicity the detailed discussion will be limited to absorption.

It is well recognized that when, at a given temperature, a vapor is dissolved in a liquid there is an equilibrium relationship between the partial pressure of the vapor and its concentration in the liquid, the nature of which varies with the substances in question. In general this relationship must be determined experimentally. For a given concentration in the solution the equilibrium vapor pressure always increases rapidly with temperature, the increase in most cases being nearly proportional to the increase in pressure of the pure condensed vapor. When liquid and gas are brought in contact under conditions such that the concentration of the liquid and the partial pressure of the vapor in the gas corres-

pond to the equilibrium just described, no net interchange of solute takes place between the two phases. However, if the partial pressure of the vapor is greater than corresponds to this curve, solution takes place: if less, the material passes from the liquid into the gas.

From these facts alone it is obvious that in such an apparatus as an oil absorption system for light oil, it is physically impossible to build up in the absorbent oil a light oil concentration higher than that corresponding to equilibrium of the absorbent with the initial gas or to reduce the light oil content of the washed gas below that corresponding to equilibrium with the initial absorbent oil. Furthermore, since the partial pressure of any component in a gas mixture of definite composition remains unchanged, whatever the temperature, provided the total pressure does not fluctuate, it follows that the lower the temperature of absorption the higher is the attainable concentration of light oil in absorbent oil and the higher the limiting efficiency of absorption when using an absorbent of any given composition.

However, one is unable to attain these ideal results because of the low rate at which equilibrium is approached. The actual performance of an apparatus is therefore controlled by the rate of interaction between the two phases.

The absorption of a vapor from a gaseous mixture by a liquid, as for example that of ammonia by water or of

*W. K. Lewis, *J. Ind. Eng. Chem.*, Vol. 8, p. 825 (1916); Donnan and Masson, *J. Soc. Chem. Ind.*, Vol. 39, p. 236T (1920); Van Arsdel, *Chem. Met. Eng.*, Vol. 23, p. 1115 (1920); Whitman and Keats, *J. Ind. Eng. Chem.*, Vol. 14, p. 185 (1922); Haslam, Ryan and Weber, *Proc. Am. Inst. Chem. Engrs.*, Dec. (1922); Van Arsdel, *Chem. Met. Eng.*, Vol. 28, p. 889 (1923); Whitman, *Chem. Met. Eng.*, Vol. 29, p. 146 (1923); Baker, *Chem. Met. Eng.*, Vol. 29, p. 500 (1923).

light oil by a suitable solvent, is by no means a simple process. The main body of the gas is insulated from direct contact with the liquid by a film of the *gas*, the motion of which is so slight that it may be considered as stationary. Furthermore, mixing of the main mass of the liquid with its surface is imperfect, due to the existence, on the surface of the liquid, of a *liquid* film of the same general characteristics. For an ammonia molecule to get from gas into water it must first be carried, mainly by convection, to the outer surface of the stationary gas film separating the water from the body of the gas. It must then diffuse through this gas film, and this diffusion can take place only under the impulse of a concentration gradient. It must now penetrate the true boundary surface between the water and the gas. The molecule must then diffuse through the film on the liquid side of the boundary surface between the phases, and finally be carried from the inner surface of this film into the mass of the liquid by convection. We are dealing therefore with five separate phenomena, each of which interferes with the result which it is desired to attain. Each of these factors must be considered in studying that result and the controlling influence is due sometimes to one and sometimes to another of them. Indeed, not infrequently several of these factors are of such importance that they should not be overlooked.

Fortunately, the problem is simplified by the fact that in all cases the movement of the ammonia is controlled by and is proportional to the concentration difference, i. e., the transfer of ammonia from gas to water follows laws of the same type as those governing the flow of elec-

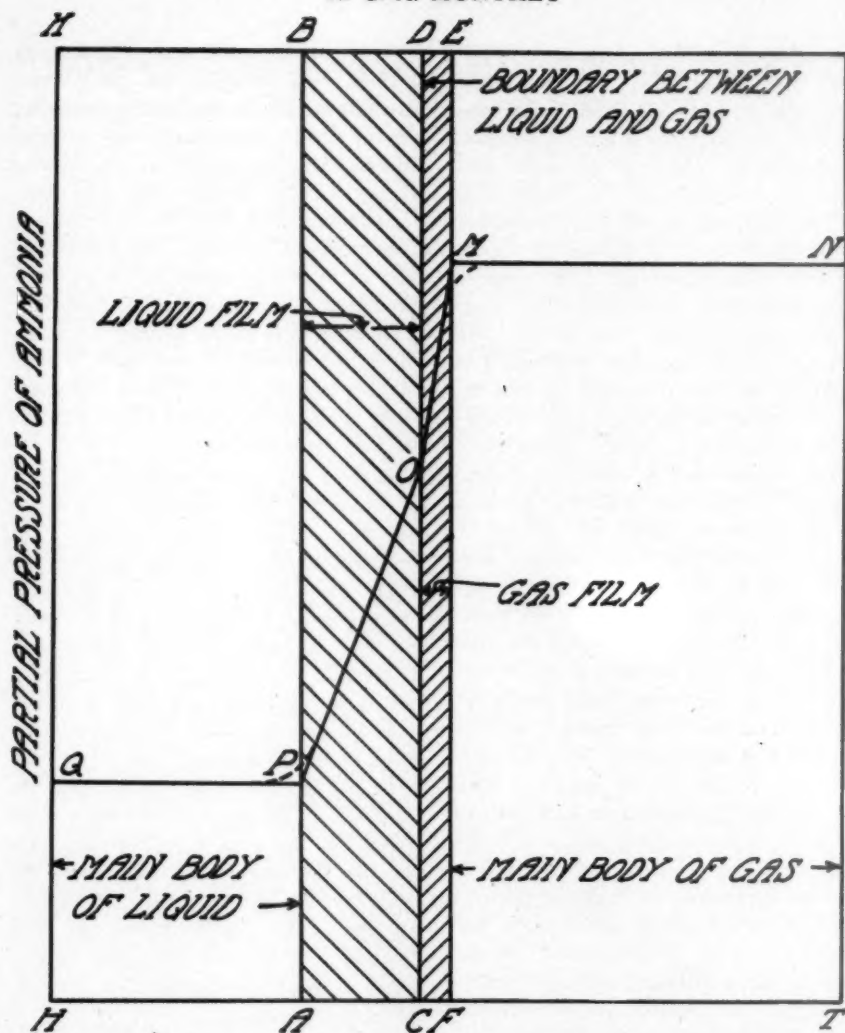
tricity or the flow of heat. Exactly as in these two analogies the phenomena can most readily be studied by assuming rate of flow proportional to potential difference over resistance, i. e., in the case of electricity to voltage drop over electrical resistance and in the case of heat to temperature drop over thermal resistance, so in this case rate of diffusion is proportional to concentration difference or its equivalent as the driving force divided by diffusional resistance. This makes it possible, as in dealing with electricity, to treat additively the series resistances encountered.

In most cases, the resistance to flow by convection in a relatively free space of either vapor or liquid is slight. In consequence it is usually possible to neglect these two factors. Furthermore, under normal conditions, it is probably true that interaction between the surface of a liquid and of a gas in immediate contact with it is so rapid that an abrupt drop in concentration at this surface either does not occur or is at most very slight. This therefore means that we are normally dealing with the resistances of two fluid films,* i. e., of the stationary gas film insulating the gas from the liquid and of the stationary liquid film separating the liquid from the gas. Through each of these films rate of diffusion is strictly proportional to the concentration gradient.

Since the concentration of a vapor in a gas is proportional to its partial pressure, and this is more easily visualized than gaseous concentration, it is usual to employ partial pressure rather than concentration when dealing with the gaseous phase.

The mechanism of absorption of a va-

*W. G. Whitman, Chem. Met. Eng., Vol. 59, No. 37 (1923).



por from a gas by a liquid will be made clearer by the accompanying diagram. The line CD represents the interface between a gas containing ammonia and water in contact with it. The concentration of the ammonia in both gas and liquid are plotted upward from the line HT as a base, but these concentrations are expressed as the equivalent partial

pressure which, if the solutions be not too concentrated are, in all cases substantially proportional thereto. The partial pressure in the main body of the gas is represented by the line MN. Through the gas film CDEF, the concentration of ammonia drops off linearly along the line MO. At O, the point of contact with the liquid, liquid

and gas are at equilibrium or substantially so. Through the liquid film, ABDC, there is another concentration drop, OP. Within the main body of liquid the concentration remains substantially constant at the value QP.

These lines are somewhat diagrammatic. Thus it is not intended to claim that the lines MN and QP are absolutely horizontal, but nearly so. Undoubtedly the lines OM and MN blend into each other by a curve somewhat as indicated in the dotted line. The same is true on the liquid side. If, however, one assumes the relations as originally drawn the results correspond quantitatively to the experimentally determined data, at least within the precision of the available data.

In the main body of both gas and liquid uniformity of concentration is maintained by convection. Through the surface film the ammonia movement is caused by diffusion and the concentration gradient is the factor maintaining this movement.

The rate of diffusion through the gas film is therefore proportional to the drop in partial pressure through the film, to its area A, and inversely to its thickness, i. e.,

$$\frac{dW}{d\theta} = \frac{\Delta p}{r_g} = \frac{K_s A \Delta p}{L_s} \dots\dots\dots(1)$$

However, in this equation, as a general proposition it is impossible to determine the film thickness. Consequently this indeterminate film thickness, L_s , is incorporated with the diffusion coefficient, K , and their ratio is replaced by a new coefficient, k , giving:

$$\frac{dW}{d\theta} = k_s A \Delta p \dots\dots\dots(1b)$$

In a similar way the rate of diffusion

through the liquid film is expressed by the equation

$$\frac{dW}{d\theta} = \frac{C}{r_L} = \frac{K_L A \Delta C}{L_L} = k_L A \Delta C \dots\dots(2)$$

In both these equations the area, A, is the same and equal to the *total* area of contact between gas and liquid. Occasionally this quantity is determinate, but usually it is not. Different types of apparatus differ primarily and essentially in the method employed to create surface of contact, i. e., to make this quantity A as large as possible and thereby improve capacity and efficiency. In a given type of equipment the effective contact area per unit of volume has a characteristic value despite the fact that the numerical value of this term is usually unknown. This quantity will be called "a." "A" therefore becomes aV and the equations may be written as follows:

$$\frac{dW}{d\theta} = \frac{\Delta p}{r_s} = (k_a)_s V \Delta p \dots\dots\dots(1c)$$

$$\frac{dW}{d\theta} = \frac{\Delta C}{r_L} = (k_a)_L V \Delta C \dots\dots\dots(2b)$$

where V is the total value of the apparatus, less any inactive portions.

Where the absorption is isothermal throughout and the concentration of the material absorbed follows Henry's law (i. e., is proportional to its partial pressure) up to the highest concentration encountered in the operation, the equations are integrable, giving

$$\frac{W}{\theta} = (k_a)_s (\Delta P)_{av} = (k'_a)_s (\Delta C)_{av} \dots\dots(3)$$

$$\text{or } \frac{W}{\theta} = \frac{(\Delta P)_{av}}{\frac{1}{(k_a)_g} + \frac{1}{(k_a)_L}} = \frac{(\Delta C)_{av}}{\frac{1}{(k'_a)_g} + \frac{1}{(k'_a)_L}} \dots\dots(3a)$$

$$\text{since } (ka)_o = \frac{1}{\frac{1}{(ka)_g} + \frac{1}{(ka)_L}}$$

$$\text{and } (k'a)_o = \frac{1}{\frac{1}{(k'a)_g} + \frac{1}{(k'a)_L}}$$

where $(ka)_o$ is the overall coefficient from gas to liquid.

In these equations for the average value of partial pressure or concentration difference one employs the logarithmic mean* of the initial and final differences. Fortunately, in the majority of absorption processes encountered in industrial practice the deviation from these conditions is sufficiently slight so that the equations can be used in this form. Thus, this is true in the absorption of ammonia by water and of light oil by straw oil or cresole as carried out in the purification of gas from the distillation of coal. The solutions produced must not be too concentrated and the temperature variations during absorption should be low, preferably below 10° and certainly not over 20°F.

When, however, one computes the overall coefficient $(ka)_o$ or $(k'a)_o$ for a given type of apparatus operating under variable conditions, one finds wide variations in the result. This is at first disconcerting until one realizes that this coefficient is influenced by two factors, both of which are profoundly subject to operating conditions, i. e., by the thicknesses of the two surface films. By far the most important factor in determining such film thickness in an apparatus of a given design is the velocity through the apparatus.**

Furthermore, since one would anticipate that the thickness of the gas film would be determined primarily by the gas velocity and of the liquid film by the liquid velocity, one must expect an influence of velocity of both gas and liquid on the capacity coefficient $(ka)_o$, of any given type of equipment. Experimental tests on absorption operations should always be planned to bring out this relationship.

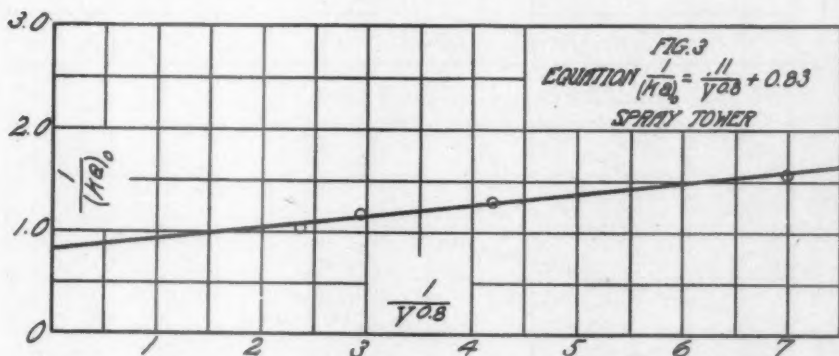
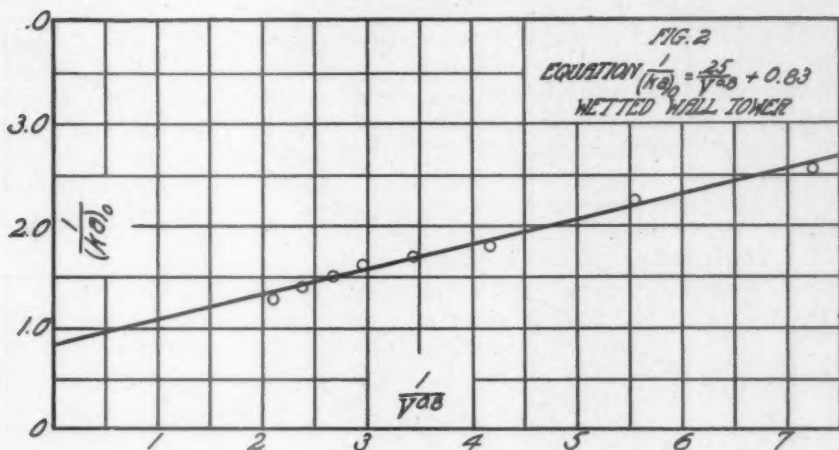
Unfortunately, there are available no data on either ammonia or light oil recovery sufficiently detailed to illustrate quantitatively the effect of both velocities. Recently, however, data have been published*** on the absorption of sulphur dioxide gas in water, which clearly illustrate this velocity effect. These authors report a series of tests, the water rate being constant in each series, but the gas velocity varying. One would, therefore, anticipate that the water film resistance would be substantially constant in each series, but that the gas film resistance would decrease as velocity increases. Furthermore, a mass of other data**** indicates that gas film resistance decreases approximately as the inverse eight-tenths power of gas velocity. Since the resistances of the two films are additive, one would therefore anticipate the relationship, $1/(ka)_o = r_L + b/v^{0.8}$, where r_L is the resistance of the liquid film and b a constant. Hence, if one plots $1/(ka)_o$ versus $1/v^{0.8}$, one would expect a linear relationship in each series. The data are presented in the accompanying diagrams plotted in this way. The results are striking, and substantiate the validity of this method of analysis.

*The logarithmic mean of two quantities, a and b , is defined as $(a-b)/\log_e (a/b)$. This integration can be found in Jour. Ind. Eng. Chem., Vol. VIII, p. 825, 1916. Whether one uses pressure or concentration difference is optional.

**See discussion in "Principles of Chemical Engineering," Walker, Lewis and McAdams, McGraw-Hill Book Co., Inc., pages 36-42, 138-142, and 438-442.

***Haslam, Ryan and Weber, Proceedings Am. Inst., Chem. Engrs., Dec., 1922.

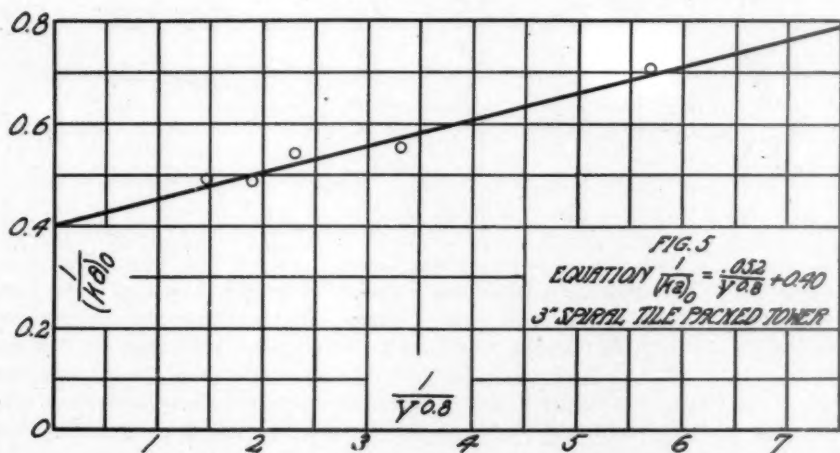
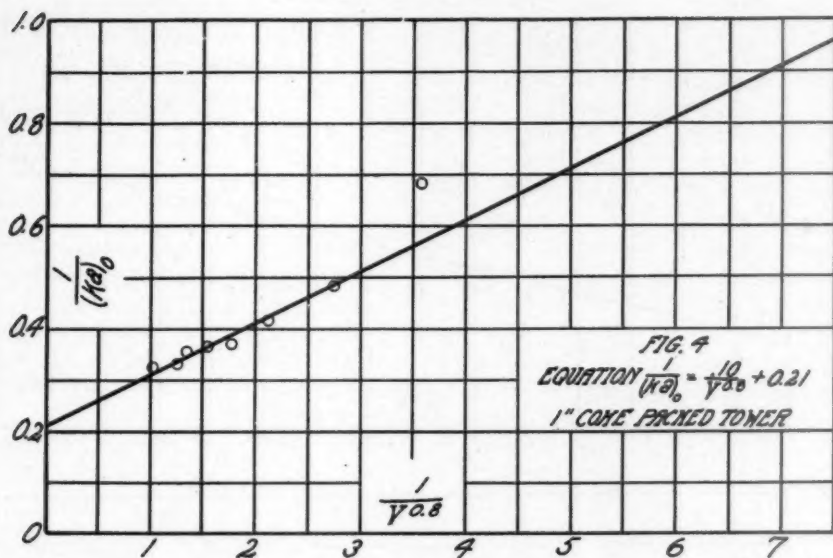
****See references to "Principles of Chemical Engineering," loc. cit.



From the relationship just developed it will be seen that the intercept of these lines on the vertical axis is the liquid film resistance for each type of equipment. An empty tower with wetted walls has a high resistance, approximately 0.8 in the units given. A spray tower has substantially the same liquid film resistance, for reasons discussed in the next paragraphs. A tower packed with 1-in. coke has only one-fourth this resistance, while three-inch spiral tile gives one-half. These comparisons are not entirely legitimate because the water rates were not in all cases identical. Ac-

curate data as to influence of water rate in these different types of equipment are not available, but indications are that the liquid film resistance is much less sensitive to change in water velocity than that of the gas film. It is obvious that this change can be determined by a series of experiments in which gas velocity is maintained constant with variable water rates.

An empty tower with wetted walls has a high resistance because of the small surface area of contact between liquid and gas. Where the same tower is packed with coke, the contact surface is



far greater and the resistance is correspondingly reduced. However, the reduction is by no means proportional to the increase in area due to the coke, because it is usually impossible to keep all the coke surface wetted. Furthermore, the decreased diffusional resistance is obtained at the expense of greatly in-

creased pressure drop of the gas flowing through the tower.

Thus, if a small volume of concentrated gas is to be treated, one could afford to use coke packing, where this would be out of the question in handling a large volume of dilute gas. Spiral packing is intermediate, both in dif-

fusional resistance and in pressure drop. In all three of these types, under normal operating conditions, the liquid flows over the solid surface in a straight line or viscous motion and increased water rate merely increases the thickness of the liquid layer on the filling. In viscous flow there is no mixing within the body of the liquid by turbulence or convection, so that the general character of the surface film remains unchanged. However, increased water rate will somewhat increase the wetted surface. Consequently, one would expect diffusional resistance to decrease with increased water rate, but not in proportion thereto. This explains why the effect of water rate is less than that of gas velocity.

Spray towers produce an extremely large surface area of liquid in contact with the gas, but each individual droplet settles out so quickly that, while its surface comes into substantial equilibrium with the gas, diffusion from the surface toward the interior of the droplet being poor and the time factor short, the whole interior of the droplet is ineffective. Hence, to secure good results, the liquid collecting by coalescence must be atomized again and again. Equipment to accomplish this cheaply has not been easy to develop. Furthermore, in spray operation, the relative motion of drop and gas is almost independent of gas velocity. If the gas is moving slowly the drop falls almost perpendicularly, while if the gas is moving horizontally the drop is carried with it, but its vertical motion and consequently its time of exposure to gas remains unchanged. Hence, gas velocity has little influence on the resistance of the gas film, as is obvious from inspection of the diagrams shown above.

Bubble-plate columns give excellent contact of gas and liquid but high back-

pressure. Since the time required for a bubble to rise through a given level of liquid is independent of the number of bubbles passing the section, it follows that diffusional resistance changes but slightly with gas velocity, provided the velocity is not sufficient to blow the liquid off the plate. It is also obvious that liquor velocity cannot greatly influence the resistance. These towers have therefore remarkably uniform tower coefficients.

In the absorption problems of the gas industry the liquid film resistance is usually the major one. Consequently, it is necessary not only to expose large surface, but also to leave that surface in contact with the gas sufficient time to secure diffusion through the liquid film. This explains the success of that type of equipment in which a thin film of liquid is carried up into the gas space, held there for an appreciable time and then returned to the body of the liquid. For spray equipment to compete with this type it is necessary to greatly increase the surface exposure or else to reform the surfaces repeatedly.

In the preceding discussion it has been assumed that during the absorption process the solution follows Henry's law and that the temperature remains substantially constant. Important cases come up in which these assumptions are no longer valid. In general such cases must be analyzed individually. One case of this type, interesting to the gas industry because its use there has been tentatively suggested, is the removal of carbon dioxide from gas by absorption in sodium carbonate solutions, the carbon dioxide being expelled from the bicarbonate by heat. In this case the equilibrium partial pressure of carbon dioxide over the solution does not follow

Henry's law because of the chemical combination taking place. In the operating range a small increase in the carbon dioxide content of the solution produces a relatively large increase in its partial pressure. This results in very great difficulty of absorption. The surface of the liquid in contact with the gas need pick up but little carbon dioxide in order to reach equilibrium. On the other hand, diffusion through the surface film is due to the concentration gradient of bicarbonate and since this is small the diffusion is very slow. So serious is this factor in plants producing liquid carbon dioxide from flue gas by this method that an absorption of only 50% of the carbon dioxide in the gas is not considered unsatisfactory.

As already indicated, the equations here presented are strictly analagous to the equations ordinarily employed for flow of heat. The performance of industrial equipment for heat transfer, such as heat exchangers, the heating surface of stills, evaporators, and the like, is expressed as a coefficient of heat transmission. While every engineer appreciates that this coefficient is not the sole factor in determining the economic value of a given apparatus, he recognizes that it gives him the simplest and best basis for comparison to help him evaluate the relative significance of other factors. The capacity coefficient $(ka)_0$, which we propose for adoption in quoting the performance of absorption equipment has exactly the same limitations and value. While for a given purpose an apparatus with a low coefficient may be economically best suited, this is true despite the fact that this apparatus possesses the disadvantage of low capacity, and its relative disadvantage can be expressed most clearly by quoting

this coefficient and comparing it with the coefficients of other types of equipment.

This method of presentation of results can perhaps most readily be made clear by applying it to data with which you are familiar, i. e., to the results of tests on a series of Doherty scrubber compartments reported by Mr. J. R. Wohrley at your 1922 Convention and given in the form of curves on page 369 of Vol. IV of your Technical Proceedings. The following table is constructed from these curves. The first column gives the number of scrubber compartments through which the gas has flowed.* The second shows the ammonia in the gas after having passed the compartments indicated, as read from the curves of Mr. Wohrley. The third gives the ammonia absorbed by the liquor up to the point in question as shown by the drop in concentration in the gas, expressed in the same units as before. The next column is the same figure converted into pounds of ammonia absorbed per minute. Next is given the partial pressure of the ammonia in the gas as millimeters of mercury, computed from the second column on the assumption that the pressure in the scrubber was atmospheric. Because of the large amount of carbon dioxide and hydrogen sulphide in the gas relative to ammonia, the ammonia in the liquor will be largely in the form of bicarbonate and bisulphide, except as stronger acids are present to combine with it. While the two salts mentioned dissociate sufficiently to give an appreciable partial pressure of ammonia, this is small compared with the total ammonia concentration. Consequently we have neglected the back pressure of ammonia at each particular point in the apparatus. The back pressure in the liquor leaving the scrubbers may be very

*It was impossible to read the curves beyond the fourth absorber.

large compared with the ammonia concentration at the other end, but is small relative to the partial pressure of the gas with which it is actually in contact. With this assumption, we have computed the logarithmic mean partial pressure difference effective in producing ammonia absorption and in the last column the corresponding value of $(ka)_V$.

Number of Scrubbers Passed	Ammonia in Gas, Grains/10 ³ cu. ft.	Ammonia Absorbed, Grains/100 cu. ft.	Ammonia Absorbed Lbs./min.	Pressure of Ammonia in Gas, Mm.	Log Mean Δp , Mm.	$(ka)_V$
184	98	86	0.380	4.46	3.32	0.114
61	123	0.543	1.48	2.70	0.101	
31	153	0.676	0.75	2.08	0.108	
11	173	0.764	0.27	1.49	0.128	

The average of these coefficients, $(ka)_V$, is 0.113. The average deviation from the mean is a trifle over 7%, while the maximum deviation is 13%. It will be noted that the ammonia concentration varied more than sixteen-fold. If an engineer, testing four units of a heat exchanger in which the temperature difference varied sixteen fold, found coefficients of heat transfer varying as little as 7%, he would be pleased with the results. We therefore feel justified in asserting that this method of presenting the results of tests of absorption equipment is sufficiently practical to be worthy of more general adoption.

Using as the dimensions of these scrubber units the figures given in the earlier part of Mr. Wohrley's article, one obtains a value $(ka)_V = 0.00068$ lbs. of ammonia per minute per cu. ft. of total volume per mm. of mercury pressure difference. Unfortunately the $(ka)_V$ values are not available for most other types of equipment, because in the past, data have not been reported in this form.

As the results of measurements available to the authors we know that slat towers of the usual type give $(ka)_V$ values of approximately 0.00022 at superficial gas velocities of 1.8 ft. per sec., while ordinary bubble plate columns at superficial gas velocities around 0.5 ft. per sec. give 0.003 in the same units, a figure about fourteen times as high.

It is rarely the case that two installations operate under comparable conditions. It is therefore impossible by present methods to accurately compare the capacity factors of the two units. This method of computations and presentation of results gives such a comparison.

The removal of a volatile component from a relatively nonvolatile liquid is accomplished by a process essentially the reverse of that just discussed, i.e., by absorbing the volatile component from the liquid into a gas or vapor, usually steam. The flow of the liquid and steam is counter current, in order to secure efficient removal. Effective contact can be provided by any of the types of apparatus used in the preceding case, though usually bubble-plate columns are employed.

Using the removal of light oil from absorbent oil as an illustration, the ratio of the weight of light oil to the weight of steam in the distillate is given by the formula

$$\frac{W_o}{W_s} = \frac{M p_o}{18 p_s} = \frac{M p_o}{18 (P - p_s)}, \text{ where}$$

W_o is the weight of light oil distilled and W_s the weight of steam coming over with it. M is the molecular weight and p_o the partial pressure of the light oil leaving the still or column. P is the total absolute pressure on the still and p_s is the partial pressure of the steam. 18 is the molecular weight of steam.

Since in such a distillation the very

large heat content of the steam is not effectively utilized, it is essential to keep the steam consumption down to a minimum, i. e., to have this ratio as large as possible. Since the molecular weight of the light oil is beyond control, the only way of saving steam is to increase p_o or to decrease P . p_o can be increased by raising the temperature of the liquid at the top of the still or column, and this temperature should be kept as high as possible without undue volatilization or the absorbent oil. Reduction of the total pressure, P , is another means of reducing steam consumption which can be made even more effective. Thus in a stripping column in a modern American plant operated at atmospheric pressure the consumption of live steam per pound of light oil distillate, of average molecular weight 85, is 5.3 lbs. Using the above formula, one finds that the partial pressure of the light oil vapor leaving the still is 29.2 mm. It should be noted that this is not the vapor pressure of light oil, but its partial pressure under the conditions actually obtaining in the top of the column. If this column were put under a 24" vacuum (6" absolute), other operating conditions remaining the same, the partial pressure of the light oil in the top of the column would remain unchanged. However, using the same formula, one sees that the steam consumption would in this case be reduced to 0.895 lbs. per lb. of light oil distillate, i. e., a saving of 83% of the live steam at present employed. Operating practice has substantiated this conclusion. In view of these facts it is surprising that so many American plants still operate their stripping columns at atmospheric pressure.

In order thoroughly to strip the absorbent oil, and as explained above, this

is of great importance for high absorption efficiency, its temperature must be maintained high. If this is done by condensation of live steam alone, the temperature limit is that corresponding to the pressure of steam in the still, e. g., at atmospheric pressure to 212°F. There is no need to adhere to this limit. The column should be heated, usually by closed steam coils under pressure. The temperature can be raised above that at the top of the column, even though a certain amount of vaporization of the absorbent oil results. This vaporization can be rectified out in the upper part of the column. Furthermore, since most of the light oil is vaporized in the top of the stripping section of the column, this part requires more heat than the bottom. While to secure complete stripping it is desirable to have the total pressure as low as possible, the back pressure developed by the bubble plates of the column can readily be more than compensated for by increase in temperature at the bottom of the column, and under these conditions the steam necessary to carry over the distillate at the top of the column is amply adequate for thorough stripping.

Since the absorbent employed is always slightly volatile, a certain amount of it will go over with the distillate if the rich absorbent oil is fed to the top plate of the column. If, however, one will introduce the feed a few plates below the top and provide a slight reflux by means of a partial condenser or, better still, by returning a small fraction of the light oil distillate to the top plate, all the absorbent will be rectified out of the distillate and the distillate will come over substantially free of absorbent oil.

By the use of these three modifications in operation, i. e., vacuum on the column,

closed coil heat supply or its equivalent at the proper points in the column, and introduction of the feed a few plates below the top with a slight reflux of distillate on the top plate, the height of existing columns can be decidedly reduced, the efficiency of stripping greatly increased, and the steam consumption lessened to a marked degree. Furthermore, in many existing columns the necessary

changes can be made at slight expense.

These statements do not apply to columns for the separation of components, the volatility of which is not widely different, as for example in the stripping of ammonia from water. In such cases, the higher the pressure under which a column is operated, the greater is its capacity and as a general proposition, pressure does not appreciably affect the ease of separation.



More of the porch exhibit at Atlantic City

Protection of Records

Our members' attention is directed to the report of the Committee on Protection of Records of the National Fire Protection Association. This report contains much valuable data on the subject of the value and the means for the protection of records. It is printed in full in the 1923 Proceedings of the National Fire Protection Association and additional details may be secured from H. P. Weaver, 135 South Fifth Street, Philadelphia, Pa.

Employment Bureau

SERVICES REQUIRED

Wanted by a gas and electric company, young man to do office work who has had experience in ledger work, general routine work, and especially on the complaint or service desk. In reply please give outline of experience, references and salary expected. Address:
Key No. 022.

WATER HEATER SALESMEN WANTED—A large gas company needs several good water heater salesmen to work on commission basis in Western Pennsylvania. Exceptionally good territory.
Key No. 026.

WANTED—Man for Assistant Gas Superintendent. Water gas only. Approximately 7700 meters. Yearly send out 250,000,000 cu. ft. Should have technical training, as well as practical experience. Excellent opportunity for advancement. Cover details of experience as fully as possible in reply. Also give age and salary expected. Address A. G. A.
Key No. 030.

WANTED—Foreman for main laying gang. Must be experienced in laying 4" to 12" cast iron main and able to handle main repair work on low and medium pressure lines. Location, New Jersey coast. State age, experience and wages expected. Address A. G. A.
Key No. 031.

WANTED—Young man able to test and adjust prepayment and ordinary gas meters. Address, Con. Gas Co. of N. J., Long Branch, N. J. Attention. C. D. Snyder.

WANTED—Recent graduate M. E. for position of Superintendent's Assistant on the Plant of one of the large Eastern Gas Companies. Address A. G. A.
Key No. 032.

MIDDLE WEST GAS COMPANY, opening Industrial Gas Dept., desires at least two high grade industrial men. City has diversified list of industrials requiring men of varied experience. Address A. G. A.
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WANTED—Salesman for a gas company in New England with 2,000 meters. Pay will be on a salary plus commission basis.—Address A. G. A.
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ACCOUNTANT—Wanted, accountant familiar with gas and electric work and who is capable of future development and growth with the organization. Company operates group of properties in five states; general office located central section New York State. Excellent future for right man. Application should indicate experience in detail, education and salary desired. Address A. G. A.
Key No. 035.

A WELL-KNOWN INDUSTRIAL APPLIANCE MANUFACTURER has two vacancies for representatives in certain Eastern states. Applicants are requested to forward full details of their experience, sales records and other pertinent information. This is a wonderful opportunity for the right man. Address A. G. A.
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POSITION WANTED—By Product, Coke-Oven Executive seeks more responsible connection. Fitted for Chief Chemical Engineer. Assistant-Superintendent or Assistant to Manager. University Graduate. Alexander Hamilton Institute Graduate. Nearly seven years with present 3000 ton plant. Thirty-two years old. Married. Address A. G. A.
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WANTED—Position of responsibility as Manager or Industrial Fuel Engineer—18 years varied experience in the gas business. References and service record furnished. Address A. G. A.
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ENG-SUPT. of one of the largest gas plants in the country would consider change. Desires to locate with company in which opportunities for future advancement are better than in present position. Is a married man. Has technical University training. No particular preference as to location. Address A. G. A.
Key No. 159.

WANTED—Position as manager of small gas plant (about 10,000 meters) or sales manager of larger plant. Can furnish the very best reference.
Key No. 158.

WANTED—To locate with gas company or combination gas and electric company, large or small, in the capacity of manager or superintendent. At present manager of Eastern company, possessed of wide experience operating, exceptional ability, unimpeachable character and pleasing personality. New Jersey or Delaware preferred, an interview will be agreeable. Address A. G. A.
Key No. 161.

WANTED—Am open for position as general superintendent, engineer or manager of fair sized property. Fifteen years' experience in combination coal and water gas plants. Experience covers vertical and horizontal coal gas installations, also distribution work. At present am managing plant of five million sendout and have been acting capacity of assistant engineer. Can furnish excellent credentials from present and past employers. Married. Can report with reasonable notice. Address A. G. A. Monthly.
Key No. 164.

AVAILABLE—Man of executive ability, experienced in all phases of the gas business and sales and advertising work including agency work on National accounts. Capable of creating, planning and following through all forms of advertising. Prefer locating in West or South Atlantic states. Minimum salary of \$4,000. Address A. G. A.
Key No. 167.

WANTED—Superintendent of Distribution, seeks similar position high or low pressure. 14 years experience covering all branches of the work. office, field, and shops. Speaks and writes Spanish. Southern part of U. S. or Latin America preferred but not essential. Address A. G. A.
Key No. 169.

AM OPEN FOR A POSITION of greater responsibility. At present, manager of gas company with over 5,000 meters. Technical training, started in as cadet engineer with one of largest operating companies in U. S. Have eleven years' experience in engineering, construction, distribution and manufacturing, and over four years' in commercial, new business and financial as manager. Prefer manager's position in good sized city. Age 40 years and married. Address A. G. A.
Key No. 170.

GAS ENGINEER—Eighteen years' experience in design, construction and operation of gas plants, all departments, manufacture and distribution, also electrical experience in combination plants desires position of responsibility with progressive company. Past six years chief engineer with large gas company. Address A. G. A.
Key No. 171.

EXECUTIVE, with fifteen years' experience in coke oven practice on plants manufacturing surplus gas for city consumption, desires connection with growing public utility either as executive or position leading to same. College graduate, good personality, married. Available on reasonable notice. Address A. G. A.
Key No. 172.

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